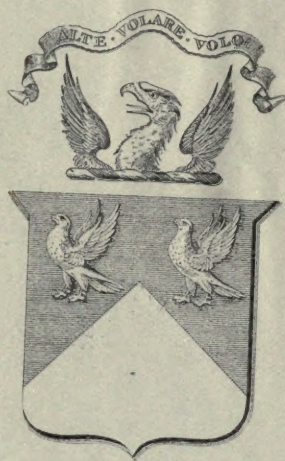


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BUSINESS, COMMERCE AND FINANCE

BUSINESS PRINCIPLES AND ORGANIZATION

BY

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370

CONTENTS

CHAPTER I. HISTORICAL SURVEY OF FORMS OF INDUSTRIAL ORGANIZATION.....	11
1. The Household System.....	11
II. The Handicraft System.....	14
III. The Guilds.....	18
IV. The Domestic System.....	25
V. The Factory System.....	29
VI. Individual, Associated and Cor- porate Forms of Business.....	35
CHAPTER II. EFFICIENCY OF THE WORKING FORCE; DIVISION OF LABOR.....	45
CHAPTER III. LIMITATIONS TO THE DIVISION OF LABOR.....	61
CHAPTER IV. THE LARGE BUSINESS AND THE SMALL	71
CHAPTER V. INTERNAL ORGANIZATION; DE- FECTS OF ORDINARY TYPES OF MANAGEMENT	87
CHAPTER VI. MILITARY ORGANIZATION.....	133
CHAPTER VII. FUNCTIONAL ORGANIZATION.....	161
CHAPTER VIII. THE OFFICE AND THE DE- PARTMENTS	185

CHAPTER IX. SCIENTIFIC STANDARD TIMES FOR MACHINE WORK.....	209
CHAPTER X. THE EXPENSE OF WASTED TIME....	237
CHAPTER XI. EFFICIENCY AND WAGES; DAY WORK	263
CHAPTER XII. EFFICIENCY AND WAGES; PIECE WORK	293
CHAPTER XIII. EFFICIENCY AND WAGES; THE PREMIUM AND CONTRACT PLANS	325
CHAPTER XIV. EFFICIENCY AND WAGES; THE STUDY OF UNIT TIMES.....	355
CHAPTER XV. EFFICIENCY AND WAGES; THE TASK PRINCIPLE.....	379
CHAPTER XVI. RELATIONS BETWEEN EM- PLOYER AND EMPLOYED.....	407
CHAPTER XVII. SALESMANSHIP AND THE SELL- ING DEPARTMENT.....	437
CHAPTER XVIII. ADVERTISING	467

In this presentation of the subject of business organization the aim has been to lay stress on fundamental principles and to avoid as far as possible a discussion of such details as would prove incapable of broad application in business.

**BUSINESS PRINCIPLES AND
ORGANIZATION**

BUSINESS PRINCIPLES AND ORGANIZATION

CHAPTER I.

HISTORICAL SURVEY OF FORMS OF INDUS- TRIAL ORGANIZATION.

I. The Household System.

The needs of men have furnished the mainspring of all industrial activities since the beginning of time. To supply the primitive wants of food, shelter and raiment our most distant forebears were obliged to bestir themselves, lest they drop out in the struggle for existence. As man develops, his wants grow in number, variety and refinement. The hut that satisfied the savage gives way to a large substantial building of many rooms, with ample provision for light, heat and ventilation. Civilized man no longer gives thought alone to his physical being, but unfolds an infinite series of mental and spiritual wants which he bends his energies to satisfying.

Various and complex as are the wants of mankind, the different ways and arrangements which have been made to supply them are almost as numerous and as difficult to analyze. It is true that primitive wants, as supplied in primitive times, called

forth comparatively simple industrial operations, but as the needs of the human family became more complex, and as the members of that family came to recognize that all were not equally efficient, that some could supply certain wants better than others, a differentiation took place which has been going on steadily from the earliest times.

Properly speaking, perhaps the simplest form of industrial organization was that which was borrowed from the animals. The foxes of the earth have holes, the birds of the air have nests, which, presumably, each constructed for itself. Since, however, even in the animal kingdom, many species coöperate or work together, in large groups, or families, such as bees, ants, and beavers, in constructing homes, dams, and so forth, the simplest recognizable type of organization is that of the family, known as Housework, or Domestic Work. This comprises production, in or around the house, for members of the household, from raw materials furnished by the house. That production of this type should have existed in the earliest times and among primitive families, seems obvious. That it exists to-day, and is seen wherever a farmer or a gardener raises vegetables or chickens or eggs or dairy products for his own table, seems equally clear.

That this system of production, however, should have remained for a long time the basis of immense industrial activity throughout a great part of the civilized world, seems hard to believe. Yet the great Greek and Roman estates, worked sometimes by hundreds of slaves, were practically household communities. The villas and manors and colonies

founded by the Romans were almost entirely self-sufficing household industries. The feudal estates of the middle ages were organized on the same basis.

Primarily, the Housework System does not involve the exchange of products; each household, or family, is supposed to turn out products made entirely of its own raw materials, intended entirely for its own consumption. Nevertheless, as Adam Smith notices, from the day on which the first savage tribe discovered that it had more bows and arrows than it needed, and not enough pottery, while a neighboring tribe was over-supplied with pottery but lacking in weapons, exchange of products to a greater or less extent has taken place. The most primitive races of Africa exchange basket-ware for pearls, etc. The Navajo Indians weave wonderful rugs, and the Moki make baskets, which they expect to exchange for things of which they have greater need. Thus the housework of antiquity and of the middle ages often developed some sort of exchange.

In the tenth century the stewards of Charlemagne's estates were directed to exchange seeds and other articles with neighboring estates, the advantages of such an arrangement being obvious. It should be noted that the moment when the element of exchange between different households begins to take place, the seeds of a change in the industrial system of production are planted. We shall have occasion to revert to this phase of the subject later on.

The next stage in the evolution of industrial organization is known as the Help or Hire System. This implies that the household hires an outsider, as an

industrial worker, giving him board, and perhaps wages, in pay for his services. A modern example is the case of seamstresses and domestic servants in general. This primitive wage work system is not clearly defined, as it may take many forms. It may be seen in the case of the blacksmith or miller, to whom the household takes iron or grain and pays something for getting it worked up. For many years the traveling tailor made his monthly or bi-monthly round among the scattered settlements of our frontiers. Even to-day the itinerant tinker goes the rounds in agricultural communities, mending pots and pans. The assistance given to our Western farmers at "harvest time," usually temporary in its nature, represents a survival of the Help or Hire system.

In its essence, however, the Help system is an intermediate and transitorial form. It is an appendage, as it were, to the fundamental family group organization. The hireling is an outsider, brought in to help out the productive activities of the household. Gradually the household enlarges its activities, and requires skilled assistance in a wider range of work. The outside workman specializes in one line, and performs his services for a larger number of families. The consumer goes to the workman, rather than the workman to the consumer. Thus settled trades arise.

II. The Handicraft System.

What circumstances gave rise to the Handicraft or Gild system, it is more easy to imagine than to

prove historically. It is not difficult to see that in the Housework System some of the members of the industrial force would prove themselves more adept in certain occupations than in others. It is also natural to assume that, even though the different operations were parceled out originally to members of a household indiscriminately and without regard for the peculiar tastes and abilities of certain members along certain lines, nevertheless if each member was kept for a long time at one particular task, he would become more skilled at that task than at any other. This assumption, to be sure, holds true only for a household so large that one task would keep a man busy a large part of the time. This condition was fulfilled on the large estates in Greek and Roman times; that many of the workers on these estates became skilled in certain trades or occupations, is a well-known fact. The father of the poet Horace was a shoemaker. The Handicraft System did not arise in ancient times, however, for two reasons. Manual or physical labor in those days was regarded with reproach and disdain, so that no man who was free cared to have his name associated with any gainful occupation. The second reason flows from the first; as those who were free could not or would not work, while those who were not free were obliged to do so, the skilled artisans of antiquity were all slaves; they had no control over the products of their own labor.

This state of affairs, representing essentially the Housework System of organization, prevailed throughout a large part of what is known as the dark ages. The skilled craftsmen on feudal estates were

not free to come and go as they pleased. Gradually, however, a change began to take place in the legal position of those dependent on feudal lords. The change from slavery to independence passed through many stages, and fills the history of hundreds of years. It cannot be described here in detail. A common case is that of the worker who would buy his freedom from his over-lord; or he might buy his freedom for a term of years, and forget to come back. In whatever way it took place, it should be noted that the freedom of the worker was essential to the growth of the Handicraft or Gild System, for the handicraftsman was a small capitalist with his own tools, who worked for such customers as needed his services.

Many other factors besides that of personal freedom on the part of the craftsman contributed to the growth of the Handicraft System. Among these might be mentioned the growth of towns, and the rise of inter-municipal communication and commerce. The causes given for the growth of towns are numerous and interesting, but cannot be considered here. Some writers contend that towns were built originally for purposes of defense, as a place where the inhabitants of the surrounding country could barricade themselves in case of invasion. Others maintain that towns were originally market places, where the neighboring farmers met on certain days or at certain fixed periods, to exchange products. Certain of these market or fair towns attained more than local reputation; they attracted traders from distant places, and even from other countries. However it may have arisen, the town

furnished a natural meeting place for artisans. Here they could come in contact with their customers, and ply their trade. Moreover, as many craftsmen along a single line of work would naturally come together in this way, the growth of some sort of esprit de corps among them was inevitable. Thus arose the guild.

Before considering the guild and its relations to the artisans, an understanding of the economic status of the handicraftsman is necessary. He was a combination of skilled workman, capitalist, employer and merchant. Often he owned the ground on which his workshop was located, in which case he was also a landlord. As a capitalist, he owned at least his own tools. At first it was usual for the customer to furnish the raw material, as he would grow or raise it himself. The near-by farmers could better find wool to be woven or hides to be tanned than the craftsman could. Gradually, however, it became convenient for the artisan to keep on hand supplies of raw material. Many of his customers who wanted cloth did not raise their own wool; and as the number of trades increased, new and varied products were turned out, calling for supplies of raw material that only the makers of these articles knew how to get. At length the handicraftsman emerges as an independent industrial force, no longer an appendage or adjunct to the Household System. He occupies his own house; he purchases his raw materials in the market; he works up the raw material in his own home with his own tools; and he sells the finished product to the consumer at his own shop or in the open market. It should be noted, however, that

the system is one of limited or very closely regulated production; the artisan produces only upon order for a special customer, or at most for weekly sale in a limited local market.

In course of time the handicraftsman often found that he had more work on hand than he could turn out alone and unaided. In that case he would take an apprentice or journeyman into his home to help. The apprentice usually served a number of years for little or no pay, for the privilege of learning the trade. At the end of his years of service he might set up for himself, as a master workman; or if prevented from lack of capital or other reasons from doing so, he usually became a journeyman, working for a master craftsman at fixed wages. When he had mastered all the details of the trade, he might set up for himself as a master.

III. The Guilds.

The coming together of craftsmen in certain lines of work led them to unite, probably at first merely from social and religious motives. As trade and commerce grew, and more and more workmen flocked to the towns, stronger motives impelled the formation of guilds; while at the same time these organizations grew more and more exclusive. Those who were already established naturally had little desire to meet competition from the newcomers. They had an object also in preventing too many of the apprentices or journeymen from becoming full masters. As a result, the guilds both strengthened their power and influence and stiffened up the entrance require-

ments. The necessary years of apprenticeship were increased, as well as the length of time required to be spent as journeymen. The making of a "masterpiece," at first intended merely to prevent unskilled workmen from entering the gild, gradually grew more and more burdensome, until at length, in many cases, a masterpiece that would answer all requirements entailed many years of labor and a heavy expenditure of money. In the same way the entrance fee, at first a mere nominal sum, in some cases grew so large as to prevent any but wealthy journeymen from entering. Oftentimes entrance into the gild was made hereditary. So that, in the end, there arose a class of journeymen who could never hope to be masters. The rise of this class of journeymen, working regularly for wages, signalizes, in the sixteenth and seventeenth centuries, the first beginnings of the labor problem.

It may be well to pause for a moment to notice the aims and objects of the gilds, both because they represent a definite stage in the historical development of industrial organization, and because in many cases a close analogy can be traced between the aims of the gild and those of our modern labor union. The chief object of craft gild regulations can be stated briefly; it was to secure and maintain an approximate equality and permanence of subsistence by the exclusion or limitation of competition. This meant that each guild must, so far as it was able, secure in the immediate town and neighborhood, a monopoly of production and sale of its particular product. To secure a monopoly of the town market—a thing which would be impossible now—was com-

paratively easy in the middle ages. In those days, town officials were regularly appointed to inspect the quality of everything offered for sale. If the town inspector could shift the responsibility for the quality of any line of products on the officers of the gild, not only was a great part of his time and labor saved, but the inspection, being in the hands of men particularly well equipped to judge of the quality of the goods, was much more thoroughly done.

Having secured a monopoly of the town market, the gilds were in a position to prevent anyone from setting up as an independent master without first joining their body. The next move was to prevent competition in the neighborhood. This was accomplished sometimes by a direct prohibition of manufacture in the surrounding country. The same result could frequently be secured by withholding the raw material for such manufacture, or by closely guarding trade secrets. An important function of the officers of each gild was to keep the lines of demarcation between each craft sharply drawn. Thus if the makers of sword handles were to take up the manufacture of blades, competition, injurious to the craft of blade makers would arise. The blending of one trade with another is to-day a fertile source of dispute among labor unions, as was evidenced recently in the Chicago Building Trades.

Permanence of subsistence for members of a craft was sought by regulating production. As we have seen, many obstacles were put in the way of entrance to the gild, so that oftentimes it was impossible for any but a son or nephew of a master to enter. The object sought was to prevent the cheapening of the

article from overproduction. It was seen in time that overproduction was not dependent only on the number of masters; it might arise from a limited number of masters employing a large number of apprentices or journeymen. A number of regulations, therefore, were aimed at restricting or regulating in some way, the amount of the product. Sometimes each master was allowed to make only so much per week, or to work only a certain number of hours per day. Sometimes the amount he might pay out in wages was restricted. On the whole, the aims and methods, and even the regulations of many of the medieval guilds, remind us of the ideals of certain modern labor unions—particularly the restriction of output, in order to make more work.

Together with regulations aimed to keep up the standard of living among craftsmen, there were others intended to secure, in a measure at least, an equality of earnings. The same thing is seen in the "minimum wage" principle among labor unions of to-day. It was not intended to allow particularly skilled or influential craftsmen to put forth their best efforts, to the detriment of the less skilled. The guild took care of this, partly by restricting each master's output or by limiting the number of men he might employ to help him, and partly by regulating the supply of raw materials and the conditions under which the finished product was sold. If possible, no craftsman was allowed to secure an advantage over another by buying his raw materials cheaper. Supplies that came through the town were usually bargained for by the guild as a whole; and all were allowed to participate in whatever bargain

was made. Sometimes the guild as a body undertook the entire task of supplying raw materials to its members, particularly in cases where the raw product had to be imported from a distance. Raw silk, for example, usually had to be imported from some foreign country. The price paid by masters for raw materials was usually fixed by the guild, under whatever arrangement they were bought, and regulations frequently limited the quantity purchasable by any master. Another means of securing equality among members of the guild is seen in its policy in regard to labor-saving improvements. Like modern labor unions, the guilds were not, on the whole, favorably disposed toward new inventions. They disliked change. Their policy was either to suppress labor-saving improvements altogether, or to make them accessible to all members of the guild. Thus if an invention was of such a nature that it required a larger outlay of capital than the average craftsman could command, the guild often made it a point to make the necessary investment and to put the new invention or process at the disposal of all. Dye-works, for example, were usually owned by the guild.

The last set of regulations intended to secure equality among craftsmen had to do with the sale of the product. In these days of freedom of commerce and freedom of contract, it is difficult to imagine the restrictions to which the most ordinary processes of barter and sale were once subjected. In the height of their power, the guilds frequently gained entire control of the town government. Restrictions as to the time, the place, and the manner of selling products were almost always imposed, sometimes by the

town, sometimes by the gild. For example, certain things could be sold only in the afternoon, and could be sold only from a certain place in the market; the seller could display them on booths, but he must not rise to meet a prospective customer. The price to be charged was almost always fixed. Rules prohibited one master from trying to entice a customer away from another. A customer who was dissatisfied could not take a piece of work half finished away from one master and give it to another. Regulations applied also to the employment of journeymen. The labor market was open only at a certain time. No journeyman could get employment, if discharged, without a recommendation.

The building up of this vast system of rules and regulations shows what a powerful bulwark the Gild System was erecting to shield itself from influences that were making for its downfall. For a long time everything was in its favor. the economy of the middle ages was averse to change. Population, production, and the relations of different classes of the community to each other were fixed and stationary. The municipal government, and sometimes even the national government, came in time to recognize the gild system, and passed laws to the effect that all the craftsmen in a town or in all towns must register in some guild. To the national government the system gave aid in levying taxes; to the local government it gave aid in inspection of products. Yet the very fact that the gilds found it necessary to strengthen the shell of their system by such powerful supports gives evidence that it was powerfully assailed; and in the end, the factors making for

its destruction proved stronger than the bulwarks thrown up to keep it intact.

The principle of the Gild Handicraft System was preserved only so long as the members of the gild remained independent capitalists, approximately equal in wealth and social standing. The attempts of the gild to secure a monopoly of production and of marketing within its area of influence, and to confine membership to a select few whose right to practice the trade was inherited, could not remain forever successful. The growth of a mass of workmen who could no longer look forward to becoming independent members of the gild and to participate in its benefits led inevitably to revolt, defiance, and competition. New industries started up wherever they could, in defiance of the old plants. More important, however, than these attacks from without were the disintegrating forces that were pulling down the Gild system from within. As all men are not created free and equal so far as brains, energy, skill, thrift, and enterprise are concerned, even with equal opportunities some craftsmen became more successful and amassed more capital than others. This capital naturally began to seek opportunities for investment, which it could not very well find within the limits of the old system. Moreover, wherever a group of closely allied crafts were found together, it usually happened that one was in a position to dominate the rest. This was particularly true in the textile industries. Along with the division of employments, which gave rise to crafts in larger and larger numbers, there had been a gradual widening of the area from which raw materials were collected

and a similar widening of the area over which finished products were distributed. In this way the craftsmen at each end of the chain might become merchants. At either end he might become an employer of members of the other crafts. The master who was occupied with the finishing processes would wish to be sure of a supply of material; if engaged in working up raw material at the beginning of the chain he would desire to secure a market for his wares. This he could best make certain of by employing members of the other crafts. The **merchant** craftsman would naturally be the most independent, the best provided with capital, and the best informed, because of his connection with the wide area trading at one end or the other of manufacture. The rise of the capitalist-merchant-craftsman-employer, who because of his dominant position furnishes other craftsmen with raw material and regularly takes the finished product from them, marks the beginning of the downfall of the Gild System.

IV. The Domestic System.

As we have seen, the predominance over the others of those craftsmen who exercised chiefly the trading function, broke the shell of the Gild System. Oftentimes within a single gild a select body of wealthier members came to exercise the trading function, while those less fortunate remained dependent craftsmen. Thus the growth of capital in the crafts enabled wealthier members to become traders, and to use their surplus capital in employing poorer members. In the Domestic System we

find for the first time a line drawn between the capitalist-employer and the workman. In the Handicraft System the employer was also a workman; in the Domestic System the employer and workman are differentiated. There is another point that distinguishes the Domestic System from all earlier forms of business organization; it is the method of sale of the finished product. In the Help or Hire System, it will be remembered, there is no selling of the product; the employer consumes it. In the Handicraft System, where articles are made only to order or for a small weekly market, the product is sold directly by the workman to the consumer. In the Domestic System, there is a wider market, with a larger production and a more extended organization. The man who makes the product no longer sells it directly to him who consumes it; the individual workman is no longer able to control the means or to devise the machinery for securing the raw material or for placing the product in the larger market. The capitalist, the merchant-trader-employer, alone can do this.

It should be noted that in the Domestic System, so-called, a large part of the shell of the Handicraft-Gild System remains apparently undisturbed. The workman, as before, continues to work in his own home or shop, with the aid of his family and often in connection with some agricultural activity; as before, he hires journeymen and trains apprentices; as before, he belongs to a gild, and obeys its rules and regulations and fails to see the Gild System proper has broken down. He is dependent on a capitalist-employer, who takes his finished product and markets it to the consumer. In some few cases he buys, or

raises perhaps, the raw material; but usually the same capitalist who disposes of the finished product can himself buy the raw material in larger quantities and to better advantage. In fact, the system is often termed the Commission System, because it was usually customary for the capitalist-employer to pay the workman a commission. Oftentimes the work to be done by each craftsman was parceled out each day or each week in advance, and the capitalist-employer hired a "runner," who delivered the raw material and collected the finished product from door to door.

We have seen that the transition from the Gild System to the Domestic System was gradual; in fact, almost imperceptible. This was due, in large part, because between the two systems there was no difference in the methods of production. The difference consisted in the area over which the products were distributed, and the general conditions of marketing the products. In the same industry, and even in the same town, the two systems existed more or less amicably side by side, and there were few outward signs by which one could tell the difference between them. In Paris, in 1712, we find the silk gild accounts recording three different kinds of master craftsmen, thus:

1. Master merchants—These were the members of the guild who had gradually absorbed the trading function, and who as gradually had given up the actual work of production on their own premises.

2. Masters working on their own account.

3. Masters working for master merchants.

These latter had sunk to a subordinate position, and together with the master merchants comprised

the Domestic System. The master merchants no longer kept a loom and a workroom in their own houses, but they furnished raw silk, gold threads, and designs to the subordinate workmen, who were paid by the piece for their efforts. The masters of the second class were the remnants of the old Gild Handicraft System. They bought their own raw material, worked it up themselves, and sold the product direct to the consumer. Their numbers, however, even then, were steadily decreasing. They were being steadily forced by the economic trend of the time, by their own necessity, and even by gild rules and regulations, to join the Domestic System, either as employers or as employés.

The independent masters who could forge ahead and accumulate capital were naturally eager to rise above their fellows, to invest their capital in supplying work for the less fortunate, and thus to enter the favored class of master merchants. The less fortunate might find that they had lost customers or favor; they might find their supply of capital insufficient to keep them stocked with raw materials; or they might find themselves confronted by guild regulations which so seriously hampered their operations that they would be glad in the end to allow others to furnish them with part of their capital and to pay them a fixed wage for a definite amount of work.

It may seem strange that gild regulations should be directed toward breaking up the Gild System. But we must remember that the Domestic System was built up entirely within the shell of the handicraft gild organization; and that, as the merchant-traders among the craftsmen became more influen-

tial, the gild really passed over into the hands of those who were seeking to destroy its ideals. In the case of the Parisian silk guild, we find in 1731 a regulation—evidently passed at the instigation of the master merchants—that masters working on their own account could not hire any journeymen or apprentices, and could have only two looms in their own house. In 1744 the dependent and the independent craftsmen revolted against the dominance of the master merchants; a struggle ensued, in the course of which the master merchants won out. This example serves simply as an illustration of the fact that the Handicraft Gild and the Domestic System existed side by side for many years, and that the change from one to the other was often so gradual as to be scarcely perceptible.

V. The Factory System.

The causes which gave rise to the Factory System, and the transition to it from the Domestic System, are difficult to explain and to analyze, because the Factory System differs fundamentally and radically from any systems that have gone before. The Factory System ushers in, really, a new stage of civilization, as well as a remarkable change in industrial ideas. The handicraft and domestic organization of industry, we are accustomed to look upon as an ideal condition. The worker lives in his home. He usually has a little piece of land around his cottage, on which he can fall back in emergency. His family can help him at his work, if they wish. He is not tied down to any definite hours. All in all, he has a

large measure of independence. But as time went on, these idyllic conditions of life began to change. The number of workers increased; the price of labor declined; the plots of land became smaller and smaller; and the workman was tied down to longer and longer hours.

The increase in competition led to improvements, and to an advance in technique. The advance in technique made it necessary for the worker to give all his time to his work; he could not afford to spoil his hands by agricultural toil. Gradually it became necessary to put the women and children of the household at machines, and we begin to hear instances of little children working twelve and fourteen hours a day at hard labor. It is doubtful, after all, if, at the time of Factory System was inaugurated, the conditions of labor were worse than those prevalent under the Domestic System.

A consideration of the rise of the Factory System presents two questions, which will be considered in order. These are: first, causes for the change; and second, the factors which differentiate the new system from the old. The cause of the change is connected directly with the advance in technique, which, as we have already noted, became necessary with the increase of competition under the Domestic System. Increasing competition made it necessary to economize in production, and to apply capital to the invention of labor-saving devices or machines in order to substitute mechanical power for human labor. The great inventions which gave rise to factory organization of industry took place in the later half of the

eighteenth century.* It should be noted, moreover, that the use of these machines under the Domestic System, in most cases presented insuperable difficulties. When production required but a few tools, and the processes were simple, the workman could use his own tools and implements, and could carry on production on his own limited premises. The new machines could not be used in this way. They were heavy, cumbersome, and very expensive; they were intended to be run, for the most part, by means of other than human power. All these factors meant a heavy investment of capital, and the gathering together of many workers in a single establishment.

If we seek for a definition of the Factory System, we can best approach the question by comparing it with the other forms of industrial organization. First, a factory assumes a wide market, for the articles must be produced in amounts greater than would be needed for local demand. Next, we note that there must be a capitalistic employer, and that the ownership of the means of production is not in the hands of the worker. The laborers under the Factory System are employed, in large numbers, outside of their own homes. Moreover, the laborers are now employed regularly. They have to work during certain fixed hours, under definite discipline, and at wages mutually agreed upon. The Factory System, as a rule, involves several other features. One is, the splitting up of the processes of manufacture into smaller and simpler elements. We shall have to deal with this when we consider division of labor. Again,

*The most important inventions were: Kay's flying shuttle, 1738; Hargreave's spinning jenny, and Arkwright's spinning frame, 1764-68; Cartwright's power loom, 1785, and Watt's steam engine, in the same year.

there is the extensive application of machinery and power. It can readily be seen that the division of the processes of manufacture necessitates gathering the workmen together, so that they can pass the product on from one to the other. Moreover, machinery cannot well be applied until the manufacturing processes have been split up into simple operations.

Some of the differences between the factory and other forms of organization may be made clearer by a consideration of the advantages and disadvantages of this system as compared with others. Some of the advantages of the Domestic System in its ideal form, from the point of view of the laborers, have already been mentioned. It is evident that the Factory System could not have been started unless the time had come when a large body of workers were driven by economic necessity to give up their independence and work in a factory. This prejudice against the Factory System, while very strong at one time, has by now been practically done away with. People have come to see that the laborer is not really worse off under the new system. The factory hand submits to having his hours of labor fixed, and to other restrictions on his time and liberty, for his own good. The chief influence of this form of prejudice against the Factory System was operative only in retarding its growth in the beginning.

The Domestic System has an advantage over a factory form of organization, in that no great expenditure for initial fixed capital is necessary. Where the workman provides his own tools and works on his own premises, the chief elements of

expense in starting an industry are eliminated. This factor operates to the advantage of the Domestic System only in communities where capital is scarce or timid, or in the case of industries where the risk is too great to attract capital seeking investment. Another advantage of the Domestic System and one which for a long time operated against the building of factories, is its flexibility. A factory, once started, has to be kept running whether times are good or bad; once it is shut down, the skilled workmen drift away, the machinery and building deteriorate, the carefully built-up organization breaks down. Under the Domestic System production can be enlarged or diminished almost at will. The workmen are where you can always find them, and during periods of dull work can fall back on agriculture or other pursuits.

As opposed to all these features in favor of the Domestic System, the factory must rest its case largely on the greater productivity of that form of organization. The laborer no longer works mainly with his hands, or at best with simple and primitive tools. He is equipped with an extensive and complex outfit of the machinery of production. The result is that the productive power of each labor unit is vastly increased. All the work is divided into the simplest elements; the mechanical and intellectual processes are separated out, and each part of the productive operation can be given to the man who is best fitted to perform it. The Factory System employs human powers of the most varied kind, whether skilled or unskilled, and sets them to tasks in which the greatest productive results can be

achieved. This subdivision of labor has led to the application of machinery to nearly all processes that are capable of being reduced to a simple repetition of the same movements or operations. As products so turned out are all of a single pattern, this principle can be applied to the manufacture of only staple articles of wide demand. From the worker's point of view, the lack of flexibility in the Factory System is an advantage; the fact that there is a large fixed capital which must be kept active, insures more steady work.

So marked is the difference between the Factory System and its predecessors, that the process which brought it about is generally called the Industrial Revolution. It must not be understood, however, that by revolution we mean any sudden and complete overturning of the old system. The process was a very gradual one. While we mark the date of the Industrial Revolution at 1760 or thereabouts, in reality it took several decades for even the textile industries to change completely over. Even to-day a large part of the silk ribbon industry of St. Etienne, France, is organized on the Domestic System. The supplanting of the domestic industry by a factory organization proceeded slowly throughout the nineteenth century. Even in England there are still a few trades like those of the chain-makers, cutlers, and glass-workers, in which the Domestic System still prevails.

It must not be thought that the forms of industrial organization which have been described are marked off from each other by sharp lines. In each case there have been survivals; in each case we can

describe only that form of enterprise which was predominant. The Family System is still found on the frontier, and in outlying regions that are cut off more or less from the rest of the world. The Help or Hire System survives in various kinds of domestic service. The Handicraft System of production is typified in the cobbler, the custom tailor, or even the repair man who will make you a bicycle to order. The Domestic System is found in many industries that are carried on by hand. Perhaps the best-known in this country is the Commission System in the ready-made clothing trade. In spite of these survivals of old forms of organization, modern business enterprise is based to an overwhelming degree on the Factory System.

VI. Individual, Associated, and Corporate Forms of Business.

Another standpoint from which to view the growth of business forms of organization is offered in the different ways in which businesses have been owned or managed. It has been assumed thus far, in the forms of organization that have been considered, that there was a single business man at the head of each. This assumption, until we reach the development of the Factory System, would not be contrary to fact. The earlier forms of business activity, such as the Household and Handicraft Systems, were not well suited to the keen economic struggle we see in modern business life. In the ownership and management of enterprises we can distinguish three and perhaps four stages—those carried on by individuals, by partnerships, and by corporations.

(1) Strictly speaking, the handicraftsman was a business man who carried on an independent enterprise. It was not, however, until competition grew keener, and production began to be carried on for a wider market, that the true business man emerged. We have seen that in the gilds certain members were more successful, and accumulated more capital, than others. These in time came to be organizers of industry. By their sagacity, good judgment, courage, and executive ability, they forged ahead, and became successful business men. In earlier times, when business enterprises were conducted on a comparatively small scale, it was not difficult for one man to cope with the situation single-handed. As business enterprises grew in size, as competition with other firms grew more strenuous, as the technical processes in manufacture grew more complex, as the marketing of products involved more and more difficult problems, as the qualities necessary for success grew in number and oftentimes special training in certain lines became indispensable, the business man found it necessary to associate himself with men who possessed the training, the talents, and the qualities which he lacked.

(2) The partnership, therefore, is a form of business enterprise intended to strengthen the one-man concern. It frequently happens that the man supplied with capital has not the knowledge required to employ it successfully in business, while the able business man may be ill-supplied with capital. The union of capital and ability, and even the union of various kinds of ability, tends on the whole to add to the economic efficiency of a concern. There are,

however, certain disadvantages and certain limitations to partnership enterprise. One decided disadvantage is that each partner is personally liable to an unlimited amount for all the debts and obligations of the concern. Thus each member may be made to suffer because of the mistakes, bad judgment, or dishonesty of any of his associates. There are few individuals whose interests are so closely linked together that each can place implicit confidence in the honesty and good judgment of the other. With the expansion in the size of the business unit, the same cause that made a partnership an improvement over the one-man concern, may make the partnership itself unsatisfactory. As soon as the business has grown so large as to call for the employment of capital beyond the means of a few partners, a new form of business ownership and management is called for. This need is met by the joint stock corporation.

(3) The corporation in its modern form, as applied to industrial undertakings, is really a development of the latter half of the nineteenth century. The advantages of corporations are three-fold: joint stock, limited liability, and perpetual life. The joint-stock principle enables business enterprise to amass capital for a single undertaking to an amount practically unlimited; and at the same time, it enables people of small means to share proportionately in the profits of a business, however large. More than that, each individual stockholder has a voice in the management of the business, in proportion to his investment; but he is not liable for the debts or obligations of the concern beyond the amount of his

investment. This normally means that, in case a business fails, a man cannot lose more than he has put into it. Under a partnership system the man who invested a thousand dollars in an enterprise might, in time, come to find himself legally bound to pay debts amounting to ten thousand dollars or more. This limiting of obligations to the amount of the actual investment removes the apprehension and distrust which prevented the growth of large partnership concerns with unlimited liability. Another advantage of the joint-stock principle lies in the mobility which it gives to the transfer and investment of individual capital. The partner could not withdraw the amount he had invested in a concern without either making some arrangement with his fellow partners or breaking up the enterprise. The transfer of shares in a corporation, on the contrary, has no effect upon the amount of capital with which it carries on business, and normally has little effect upon its business policy. The affairs of a corporation are conducted by a majority of the stockholders; and normally it is only by a transfer and concentration of a majority of the stock to a single person or interest that the business policy of a corporate concern can be fundamentally affected.

Finally, the corporation has perpetual life. Unlike the individual, unlike the partnership, a corporate concern never dies until the business is liquidated. This gives it all the advantages of permanence and stability. It can plan for the future, far in advance. As an example of this, some corporations have borrowed funds, by an issue of bonds, which are not payable for sixty or even for a hundred

years. Permanent improvements can be undertaken, and investments made, which would be impracticable in the case of an enterprise destined to end with the life or disability of any one of a number of men.

The corporation, however, is not perfect; it does not solve all problems. The flexibility and freedom from restrictions of this form of business undertaking naturally give scope for many abuses, which have been called collectively the "corporation problem." As a single concrete example, we may take the case of the minority stockholder in a close corporation. Let us suppose that all the stock in the corporation is owned by six persons and that three of these persons succeed in getting control of more than 50 per cent of the stock. It is then perfectly possible for these stockholders to vote themselves president, treasurer, and other officers of the corporation, at salaries so large as to absorb all the earnings. The minority stockholders are thus "frozen out." It is true they may bring suit against the officers for fraudulent practices; but in many cases the fraud is difficult to prove, and in practice the minority stockholders are usually left without redress. The consideration of this part of our subject, since it belongs more properly to the treatises on corporation finance, and commercial law, need not engage our attention further. In the other volumes of this library will be found also a discussion of those disadvantages of the corporation which are concerned with the protection of "innocent investors," the mutual relation of stockholders and bond-

holders, and the enforcement of real trusteeship on the part of the directors.

Finally, the corporation proverbially "has no soul." As against the public, the corporation will often do what individuals as such would shrink from doing. A million dollar sugar trust will have no hesitation in committing so "raw" and shamless a fraud as "short-weighting" the government scales in the custom house, whereas a one-man firm or a partnership would shrink, at least, from attempting to make money by so primitive and unrefined a method of cheating.

It is easy to see that, in the case of an individual, it is not only more easy to locate the source of misdoing, but also that punishment which follows will extend beyond a mere pecuniary loss. The guilty individual is in danger of losing the honor and respect of the community, or may even suffer corporeal incarceration. In the case of the sugar trust fraud, two months of diligent investigation by government officials have resulted so far in proving only that some irresponsible underling must have known that something was going wrong. The real responsibility for the crime has not been definitely placed, and probably never will be. Examples might be multiplied almost without number; this one will suffice to show that it is no easy task to raise the plane of corporate morality to that of individual business ethics.

With all its shortcomings, however, the corporation has conferred inestimable benefits upon the community as a form of business enterprise. It is an efficient and effective and well-built engine, with which the community carries on its economic activi-

ties. Perhaps sometimes it does not run with perfect smoothness; sometimes the different parts are not well oiled; but without it the community would virtually renounce the most effective instrument yet devised for the most complete utilization of capital.

What may perhaps be regarded as a fourth stage in the ownership and management of business undertaking is what is popularly known as the "Trust." A trust is, briefly, a union of corporations. In the popular mind the term "trust" is usually associated with monopoly in some form. We shall have to revert to this phase of the question when we come to consider the advantages of large-scale production and of monopoly.

Although the material in this chapter is mainly historical, the practical value of the lessons which it contains for everyone who is anxious to acquire a better understanding of the principles of business organization will at once occur to the thinking man. The broader fundamental principles of industrial enterprise should be made a basis for immediate, practical application to actual business problems. In reviewing the historical forms of organization it was pointed out that none of the old forms has disappeared. New forms have been added to the old, and have been applied in those enterprises for which they were best fitted; but in each case there have been survivals. Some forms of business, even to-day, find the older forms the best. It is well, therefore, to know what the various organizations of industry have been, how they have worked, what forces have tended to cause them to break down in certain industries, and what advantages and what disadvantages,

viewed from the standpoint of economic life to-day, apply to each one. As we come to examine the factors that make for success in different lines of business, and come to see the bearing of the forms which the different lines of enterprise take to other factors that make for success or failure, we shall have occasion to revert to the history and principles that form the subject matter of this chapter.

In conclusion, it should be noted that the variety of forms in which business to-day is carried on offers opportunity for a two-fold adaptation. For men as well as enterprises are adapted to different forms of organization under varying circumstances. Men with money to employ profitably are interested to know whether, in view of their personal abilities, their technical training and knowledge, their ability to command capital and the confidences of the community, it is better for them to go into business alone, to take partners, or merely to buy stock in some corporation. If a man is a good manager, a good organizer, well grounded in the principles of business, an individual enterprise conducted by himself alone will furnish him the best opportunity to prove his mettle.

As against the abilities, training, and opportunities of the man, the nature of the business and the conditions surrounding it (many of which will be considered in later pages) must be taken into account. If large capital and the production of a stable article of wide demand are called for, the corporate form is best. An individual one-man concern is, in general, more flexible, more easily adaptable to changing conditions, than a corporation. A small

business, and especially one that must meet changes of tastes or fashions, is best conducted, usually, under one man's control, in a small shop. If the work can be carried on in homes, and particularly if the enterprise is so located that large masses of workers can be hired at low rates in their own domiciles, the Domestic or Commission System is often best.

Above all, emphasis must be laid on the fact that in business no hard and fast rules can be laid down. Success in business depends not on applying rigid and inflexible dogmas, but in assembling all the factors that bear on a particular situation, and then outlining a policy based on a careful weighing of the relative importance of each factor. He who would win out must apply the principles gained by systematic study with common sense and sound judgment.

CHAPTER II.

EFFICIENCY OF THE WORKING FORCE: DIVISION OF LABOR.

Chief among the advantages to be gained from a study of the principles of business organization is a knowledge of those factors which tend to increase the productive efficiency of business enterprise; for the successful business man is he who can arrange his factors of production in such a manner as to produce the greatest net results at the lowest cost. Since the greatest element in the expenses of production is labor, a study of the means of increasing the efficiency of labor and of combining labor with the other factors of production in the most economical and most effective way, is vital for the proper understanding of our subject.

The relation of labor to production, and to business activity in general, is many-sided; it involves more problems than can be even briefly explained in a single chapter. In the present chapter, therefore, we shall first indicate briefly the nature of some of the problems of labor that will be dealt with more directly in later sections; and, secondly, we shall lay stress on those factors affecting the efficiency of labor which are generally understood to be comprised in the term "division of labor."

When the Senators and the members of the House of Representatives begin to debate on the desirability of affording tariff protection to an American industry, the first assumption made (and one that is usually granted by both sides) is that the "protection" should be sufficient to cover the difference in wages in this country and abroad. It is assumed, in other words, that low wages make low cost; on this premise the man who is paying the lowest wages ought either to be making the highest profits or to be selling his goods at the lowest prices. The assumption, as well as the argument based on it, is so palpably unsound in theory and so out of accord with actual facts, that it is surprising to find it advanced by anyone in serious debate. The real cost of a laborer's work, from the employer's point of view, is not measured strictly by the amount of money in the man's weekly pay envelop; rather is it to be gauged by the productive efficiency of that laborer—by his power of doing efficient work, as compared with his pay. The shrewd business man considers two equally important factors here: the amount and quality of the work, and the amount of the payment. The railway president who receives \$50,000 a year may be really cheap, because an inferior man who could be hired for one-tenth of that amount would tangle up the road, increase expenses, and cost in the end much more than the high-priced but better man. So it is in the case of the ordinary wage-earner. The weaver who turns out 50 yards of cloth, and is paid \$10 a week, really costs his employer more than the man who weaves 100 yards of cloth and receives \$15 a week. In our southern cot-

ton fields, the Italian workman has been preferred of late years to the negro, although he demands and receives higher wages. The Italian is more industrious, more reliable, more anxious to do his work well—in a word, more efficient than the colored man. He receives higher wages, but his labor costs less.

The problem before the employer in this question of labor cost is, to what extent will it be worth my while to employ better men at higher wages? But this side of the problem is not even as simple as that. It has repeatedly been proved that in the same industry, and with the same workmen, an increase of wages or curtailment of the working hours may result in actually lower labor cost to the employer. It frequently happens that an increase in wages or a reduction in labor time will result in infusing greater energy, greater care, and greater assiduity on the part of the workmen, and will result in greater output. We shall have occasion later to give particular attention to the best and most approved methods of increasing the efficiency of labor by increasing the amount and changing the form of remuneration. That there is often a true economy in high wages, especially in cases where a high grade of intelligence on the part of the workmen is necessary to secure the best results, is shown by our exports of manufactures. Our iron and steel manufactures, boots and shoes, clocks, cash registers, and sewing machines, which successfully compete in foreign markets with the products of low-priced labor, are made with the highest-priced labor in the world. These are the industries, strange to say, in which the wage-

scale, even for this country of high wages, is markedly higher than in any others.

There is a limit, of course, to the economy which may be effected by hiring more efficient men; a limit to the effect of an increase of wages in lowering cost. Higher wages that do not bring correspondingly increased efficiency do indeed mean greater labor cost. It is the task of the wise business man to apply an increase of wages in such a form that there can be no doubt as to the results. The mere fact, however, that goods sell at low prices, tells us nothing as to the scale of wages in an industry. The cheapness of a ready-made suit in a department store may be due to low-priced labor in a sweatshop; the cheapness of an Elgin watch is not incompatible with the very highest wage-scale.

Since the cost of production is as deeply affected by the productive capacity of the laborer as by the wages paid, the problem of increasing the efficiency of labor, and the importance of giving careful and painstaking attention to all the methods which tend to bring about this result, cannot be overestimated. We have just pointed out that one way of increasing efficiency may often lie in an increase of wages, or in a reduction of the working hours; and we have seen that this is effective only so far as it can be done in such a way as to increase the energy and productivity of the laborer to an extent greater than that measured by the increase of pay or the shortening of hours. In the peaceful commercial warfare that is being waged among individuals in the business world, and even among nations, more and more attention is being given by the organizers and managers of in-

dustry, to the problems of increasing the efficiency of labor. It may be noted in passing that in this matter the employer and employes are working hand in hand; workmen who increase their productive powers increase their own pay, and secure better living conditions; and the success of a nation among the commercial powers of the world is largely dependent upon the ability of a nation's working force to contribute to its own uplift through an increase of efficiency.

First of all, among nations which have been most successful in developing their industrial resources and reaching out for the world's commerce, education has become more and more recognized as a powerful weapon. The old-time prejudice against the college-trained business man has given way to the recognition of his superiority. The unparalleled advance of German trade and commerce in the last score of years has been long attributed in large measure to the excellence and thoroughness of German commercial education. The business career is rapidly acquiring, and ought to acquire, a recognized professional standing. Every young business man demands a training which shall not only enable him to maintain his place in the profession, but one which shall help him to become a leader in raising the standards of business efficiency in the broadest and best sense of the word. To rise to such a position he must be able to look beyond the routine duties of his work and grasp the broader principles upon which business success is founded.

At a time when many of our great business firms were in process of formation, a young man who se-

cured a position in a thriving business and grew as the business grew, obtained perhaps the training best adapted to the needs of that time. The situation at present, however, is essentially different. Not only has business become infinitely complex and specialized, but the far-reaching public relations of a great modern business are demanding more and more qualities of mind and spirit which a comprehensive systematic study of business in its broader and more fundamental relations is best calculated to foster.

Education is adapting itself more and more successfully to the needs of the ordinary man in a workaday, business world; technical and commercial schools of all kinds are being multiplied, and the experience and material that have been collected by the great educators and great business men of the country are being rapidly extended to the remotest corners of the country, and there eagerly absorbed.

Many of the problems of our social and industrial life are being referred for solution to that same panacea, education. The kernel of the negro problem in our Southland is seen, by those who have given it the most careful attention, to consist in the increase of productive efficiency, through educating the negro to habits of orderly and reliable work.

We approach the same factor from another side when we lay stress on the value of provisions for securing the physical, moral, social, and intellectual advancement of the workmen, as contributing directly to an increase in his labor efficiency. Among human beings, the same laws apply as among the inanimate factors of production. The finer and more highly developed the machine, the greater will be the

product. The short-sighted employer, as we have seen, is he who employs only the ostensibly cheapest labor. Perhaps equally blind to his own interests is he who fails to surround his workmen by an environment of comfort, cleanliness, and attractiveness, with proper provision for recreation, social enjoyment and education. Nor can we believe that the increasing stress that is being laid by successful employers on what is called sometimes Social Welfare or Social Betterment work, is attributable entirely or even chiefly to philanthropic motives. We shall have occasion later to examine more closely the work of certain concerns along these lines. In some instances we shall find that the idea has been overdone or poorly managed; but on the whole, the great mass of evidence tends to show that employers believe in providing for the welfare of their work people because they think it is "good business"—because they believe that the increased expenditure involved more than comes back to them in a lowering of the cost of production through the increased efficiency of the working force.

We come now to what has, perhaps, since the beginning of economic and industrial time, proved the greatest factor in increasing the efficiency of labor and in lowering the cost of production. It is called by various names,—specialization of labor, division of employment, differentiation of employment, division of labor, and so on. For convenience, we shall use the most widely accepted term, division of labor, in its broader sense. Briefly defined, we may say the division of labor is "that process by which an economic task is transferred from the one person hith-

erto performing it to several persons, the transfer being so made that each performs but a separate part of the previous total labor.”*

The reasons for the increase in industrial efficiency gained by division of labor are too obvious to need detailed explanation. Briefly stated, it is obvious that every person is not equally qualified by nature for every employment. Each person in the world differs from everybody else in physical strength, mental training, environment, and natural ability. There is an obvious economy achieved if each person devotes his attention exclusively to that task which best befits his natural and acquired capabilities. He who can excell his fellowmen in brain work ought not to waste his time performing purely muscular operations. Many other advantages will occur to every reader. It is obvious, for example, that exclusive devotion to one kind of task will make a man specially skilled in performing that work, a result which would not be achieved if his energies were dissipated over a wider field. Another saving comes from the fact that no time has to be spent in passing from one employment to another, or even in laying down one set of tools and picking up another. Other advantages of the specialization or division of labor will be pointed out as we consider the different forms it may take.

Viewing the question historically, it should be noted that all the forms of business organization have been examples of division of labor. Even in the household industry there was from the earliest

* Bücher, “Industrial Evolution,” Chap. 7. (Translated from the 3d German edition. New York, 1901.)

times and there is still today a differentiation of economic function between man and woman. The rise of a class of traders, on which little stress was laid in the chapter on the forms of business organization because it had small bearing on the development of that subject, should yet be noticed here as an example of the division of labor. In the same way in primitive societies the development of a military class, a priestly class, a law-making and law-enforcing class, out of the original single industrial group, represented a saving of labor to the community as a whole. As Professor Seligman remarks, "The development of the priestly class, although of chief importance from a social and religious point of view, had a noteworthy economic effect in that it permitted the industrial class to devote itself more unremittingly to the daily task of production, without giving so much of its time to the independent propitiation of the malevolent spirits. The priests were, in truth, a labor-saving device."* Up to the time of the rise of the handicraftsmen, however, we noticed no marked differentiation of labor so far as it applies to industrial production proper. The artisan who gave his whole time to the manufacturing of a single commodity, marks a differentiation of an industrial class as distinguished from the agricultural and commercial classes.

The differentiation among the guilds themselves, and the rise of the Domestic System, marked newer stages in the division of labor. In the textile trades the growth of the clipper, the spinner, the weaver, the dyer, the finisher, the tailor, and so on, meant

* "Principles of Economics," p. 291. New York, 1905.

that an industrial process that originally was performed by a single man now passes through the hands of perhaps a dozen men, each of whom makes a specialty of his part of the work. The same principle of industrial specialization is applied today under the Factory System. Using for our example the same industry, there are certain mills which manufacture only yarns; others devote their activity solely to weaving yarns into cloth; and still others do nothing but print patterns on cloth that has been prepared for them in the other mills. The advantages of specialization of this kind are numerous and clearly seen.

For our purposes, the most important saving effected by the division of labor is connected with that use of machinery and grouping of men in one establishment which is so characteristic of the Factory System. The difference between this and the previous form of division of labor is, that this represents the differentiation of function among the workmen of a single establishment, rather than a specialization in different establishments. The principle that has been found so effective in this case is that of splitting up all operations into their simplest elements, and devoting the energies of each workman to one elemental task.

It is obvious that this specialization on the part of the workman saves time both in learning his task and in executing it, while the constant repetition of a single operation greatly increases his dexterity. Equally clear is it that the greater the differentiation of work in a single establishment, the greater chance there will be of finding the right man for the right

place,—of finding that particular task which each person can do best.

Thus far we have spoken only of the division of labor, as applied in production resting upon human labor power. With the application of machinery, we find that human labor can be even further subdivided. Many machines are so nearly automatic in operation that they need only a very little attention on the part of the operator. In the case of ribbon-weaving machines, for example, the worker has little to do except to see that a supply of thread is kept on the spools; and it is no uncommon sight to see a so-called ribbon-weaver turning out two dozen pieces of ribbon at once. It is evident here that the possibilities in the reduction of cost are almost infinite, for we are dealing not only with enhanced human dexterity, with the simplification of the processes, but with the almost infinite chain of labor-saving devices. These two factors, so important in lowering cost of production, interact upon each other. The division of a complicated process into simple and ever more simple operations, increases the possibility of inventing machinery which shall be capable of performing part of the work. In shoemaking, for example, at first every operation was performed by hand. Gradually there was a differentiation of labor; the soles were made by one set of persons, the uppers by another, the sewing by another, and so on. About 1840 a pegging machine was invented; in the middle of the nineteenth century came the sewing machine; and gradually, more and more of the operations that had been performed by hand were taken care of by automatic devices. To-day in many factories a shoe is

scarcely touched by the human hand, from the beginning to the end of its manufacture. Just as division of labor facilitates the application of machinery to all the processes of simple repetition, so the invention of machinery itself leads to a more minute subdivision of labor, and to an increase in the possibilities of devoting the energies of each workman to the tasks for which he is best fitted. This minute subdivision of labor has frequently reduced human energy to the repetition of a single act, like a thrust, a pull, or some other simple manipulation of the machine.

The saving in cost of production through division of labor and the invention of machinery that has gone with it is so great that it can scarcely be estimated. In the production of screws, one man can turn out with the aid of machinery over 4,000 in the same time that it would take him to make one by hand. Adam Smith, writing in 1776, pointed out the advantages of division of labor in the making of pins. He showed that if one man were to perform successfully all the operations necessary to turn out a pin, he could make only a few in a day. He then explained that the pin-making process was divided into eighteen separate and distinct operations, with the result that each man could turn out about 5,000 pins a day. Since Adam Smith's time, division of labor has led to the invention of machinery in those operations which involve only simple repetition, and the use of machinery has still further increased the division of labor and enhanced the economies derived therefrom, so that the daily product of a workman

today is said to average some fifteen millions of pins, stuck in papers and packed for shipment.

Another form which the specialization of production may take is concerned with the localization, or grouping, of industries—in other words, territorial or geographical division of labor. It is obvious that the location of an industry may be affected more favorably by labor conditions in certain localities than in others. A geographical division of labor supposes that there are peculiar advantages in certain localities for certain industries. The large department stores, for example, in any great city, usually cluster around some certain well-known section or business street. The advantage gained in this case, as in many others, is that there will be most trade where most people come. In agriculture there has been enormous gains in productivity through concentrating certain crops in those sections of the country which are best fitted by soil and climate to grow them. The most important causes which influence the grouping of industries, which cause economies through bringing industries to those places that are most favorable to them, may be summarized thus:

1. Nearness of Raw Material or Fuel.

In the South, the iron mills are located at the spots where ore and coal are found in juxtaposition. Paper mills thrive best near to the forests whence comes their raw material. On the other hand, it should be noted that the development of transportation has in many cases done away with this factor in large measure. If the raw materials can be brought

cheaply and readily from the places where they are found, it may be advantageous to ignore nearness to sources of supply, and to locate the industry with reference to some other advantage. This factor is often of vital importance, however. The glass-making industry cannot move away from the natural gas regions.

2. Nearness to Market.

The Pennsylvania iron and steel industries draw their ore mostly from the Lake Superior region by a wonderfully efficient system of transportation; and the finished product has all the advantages that come from nearness to the market, where the pulse of trade is keenest and the wants of customers quickest felt. Nearness to market is particularly important in the case of articles liable to be affected by changes of fashion. Nearly all the silk goods in the United States are made in or near New York City.

3. Labor Supply.

Many industries are dependent for success on an abundance of skilled labor. Laborers will congregate in those regions where for various reasons industries have concentrated. Thus it is often advantageous for a new manufacturer to establish himself where others have gone before him. Nearly all the men's collars in the United States are made at Troy, N. Y., and the reputation this town has acquired as a collar center makes it almost impossible for a manufacturer of such products to succeed anywhere else.

4. Presence of Large Supplies of Capital.

This brings attention to the necessity of adequate banking facilities. A manufacturer must often carry on his business on borrowed capital; and investors are loathe to risk their money on far-away enterprises.

5. Water Power.

The textile industries of New England were started near water power. The development of steam power has for several decades made this influence of little account. Recently, however, the possibility of developing electrical power from running streams has given this factor increased importance. As the supply of coal becomes scarcer, it is believed by all who have given this matter serious study, that the development of power from water-falls is destined to have a tremendous influence on our industrial development.

6. Climate.

A moist atmosphere is needed for certain parts of the cotton industry, as it drives the electricity out of the fibres. Certain other industries are affected by climatic or atmospheric conditions, but this influence is not of such great importance in manufacturing as in agriculture.

CHAPTER III.

LIMITATIONS TO THE DIVISION OF LABOR.

To the practical business men, the lessons to be learned from this principle of division of labor will present themselves in the following form: First, he must make certain in what line or lines of industrial activity his talents and his opportunities give the greatest promise of success. Next, he must select the locality which is best fitted for his particular enterprise, having due regard to the nearness of raw material or market, supply of power, favorable climate, the abundance of cheap or skilled labor, and the supply of capital or credit facilities. It is not necessary to emphasize again the fact that all of these factors are not of equal value; that the question of proximity to raw material, for example, might be of vital importance to some industries and of no importance at all to others. For an industry that is already in operation, the technical division of labor (that which has to do with cheapening the actual cost of production, by the splitting up of industrial processes into their simple elements, so that each workman may specialize on a single operation, and by the application of machinery wherever possible) is of chief importance.

With so many examples of the saving of cost

effected by technical division of labor constantly before our eyes, it may not be amiss to point out certain limitations to the application of this principle. First it should be noted that division of labor means production on a large scale. The process of making shoes, for example, cannot be split up into its smallest elements unless enough shoes are made to employ the entire time of at least one man to each minute subdivision. To take a concrete case, let us suppose that one man does nothing but put in eye-holes. If he works by hand and can put eye-holes in 500 pairs of shoes per day, he cannot profitably be employed at this one task alone unless the daily output of the establishment amounts to at least 500 pairs. If, now, the eye-holes are put in by machinery, and a single man by the aid of the machine can make eye-holes for 5,000 pairs of shoes in a day, neither the machine nor the man can be employed to full advantage in an establishment whose output is less than 5,000 pairs daily.

There is again a certain class of articles which, from their nature, give less opportunity for the successful application of the division of labor than others. Articles produced on a large scale, by the work of many hands, each of which performs alone a single part of the production process and performs the same operation for thousands of other articles, do not develop a great deal of individuality. There is little chance for variation in the production of articles made by machinery. Division of labor, therefore, can be applied only to goods for which there is a large and stable demand, for which the element of individuality makes little difference as to the value,

and which are little subject to the whims and fancies of fashion. A striking example of this principle is the matter of human headgear. The masculine portion of the human race are content, on the whole, with hats made on one or two simple patterns. It is a matter of little concern to a man if his hat looks precisely like thousands of others, provided only he has his initials inside the band, or some other means of identification, so that he is not in danger of inadvertently trading with somebody else. The ordinary man does not care if his hat looks as much like any one of ten thousand others as two peas in a pod. Men's hats, therefore, are made almost entirely in enormous establishments, which take advantage of the most minute specialization and division of labor and machinery. Ninety per cent of men's hats in this country are made in Danbury, Connecticut. Not so with women's hats. The feminine portion of the human race have never felt the necessity for putting their initials on their headgear for purposes of identification. Fashion dictates that, on the whole, no two women's hats shall look alike; and whereas a man would feel hurt and out of place if his hat were different from everyone's else, a woman would feel hurt and embarrassed if she knew that there was one other single hat exactly like her own. In other words, woman's headgear must have character, individuality; this cannot be secured where machinery is used, nor is it compatible with too great an application of technical division of labor.

Another instructive example is the manufacture of furniture. The ordinary chairs, tables and desks can be made in large amounts from a single pattern.

Furniture so made is entirely satisfactory to the ordinary run of people. Some there are, however, who must have "something different." For these, furniture possessing individuality must be manufactured; "Louis Treize," "Louis Quinze," "Mission," and other varieties, must be turned out by skilled artisans, by hand labor, in small amounts. So it is with a vast number of articles. As soon as it becomes the fashion to have something different from what everybody else is wearing or using, the subdivision of labor and the application of machinery to the manufacture of such products is limited.

Mass production cannot be applied in the case of some articles because of their physical qualities. Houses, for example, might easily be made in large quantities in specially equipped factories, if they could easily be shipped where needed. All very bulky products are subject more or less to this restriction; for unless they can be sold in large quantities, there is an early and definite limit to the division of labor in their manufacture. Another physical property that offers difficulties may be the hardness or the brittleness of the material to be worked up. Articles made of stone cannot, in many cases, be chiseled or cut by machinery; and the stone cutter, even to-day, is a skilled artisan who works almost entirely with his hands. The carpenter, on the contrary, is coming more and more to be a man who tends a machine. There are many concerns in this country which make a business of turning out all the parts necessary for the building of a frame house. The houses they make are of standard sizes and patterns, and the parts are all made by machinery. In

the construction of stone houses the labor cost is many times greater than is the case with wooden houses; and their price is proportionally higher, because of the limitations set to the division of labor and the use of machinery by the nature of the material of which they are composed.

As concerns the workman himself, division of labor, while it increases his efficiency directly, is said to have a detrimental effect, indirectly, in the interest which he takes in his work. By confining him to the constant mechanical repetition of a simple act, it tends to make him a machine, rather than a man. As he is no longer responsible for the quality and good workmanship of a finished article, he takes no pride in his achievement; while the monotony of constant repetition tends to stifle and repress all his powers of initiative. This is indeed a fault of our modern Factory System, but it can be averted. The greater intensity and monotony of factory work furnishes us with the reason why business men find it profitable to pay attention to the education, stimulation, health, housing, and social betterment of workmen. They find that it pays to arouse their interest in their work by allowing them a judicious amount of leisure. This changes their attitude toward the work itself. When the workingman feels that the greater intensity of his toil means a greater productivity that brings to him higher pay and shorter hours, his whole standard of life may be elevated. His daily task need not, as in days gone by, engross the whole of his mental and physical energy. The specialization of labor may even be made to give a man that pride which comes to the specialist; for the highest grade of labor to-day

is not that of the small shoemaker who makes the whole shoe, but that of the specialist finisher in the great shoe factory. In short, division of labor may be made a benefit to the workman rather than a thing to be dreaded, and may remain an aid to production without becoming a menace to individuality.

To the business man there is much food for thought in the discussion of methods, results, and scope of the principles of increasing efficiency of labor. It need not be explained that greater efficiency on the part of the working force means larger profits to the enterprise, as well as higher wages to the workman. We have seen that the possibility of increasing the productivity of the laborer does not apply equally in all cases. It differs according to the nature of the product, the location of the business, the size of the establishment, and the form in which it is organized. To the business man who is not already established, these factors should be taken into account in deciding what line of enterprise is likely to promise the greatest development and the largest profits in the future. Moreover, it should be emphasized that the successful application of division of labor and of other principles tending to increase efficiency may be seriously handicapped if it is inaugurated by a manager or foreman or proprietor who has not the qualities and training that make him a good organizer and manager of men. If he is not acquainted with all the factors that make for greater efficiency, and with all the conditions under which such factors are limited in their applica-

tion, satisfactory results may be negated at the very beginning.

Division of labor and stimulation of various kinds do not describe the whole of the processes which go to make a working force efficient. The most scientific specialization of the laborers, and the best approved methods of stimulation, may still go for naught unless the labor force is arranged and organized in the most economical and effective manner. In other words, labor must be combined both with itself and with the other factors of production in the most efficient way. The task here is one that belongs to the manager, and the questions it brings up are too numerous and too vital to be dismissed in a few paragraphs. It may be well, however, to summarize briefly the problems presented, in order that we may see in a broad perspective the relation of business management to the efficiency of labor.

(1) As we have seen, the relation of labor to capital, and the ways in which labor coöperates with capital, are of fundamental importance. The advantages of division of labor begin to assume magnificent proportions when machinery is employed. The efficient manager must combine labor with capital in exactly those proportions which will yield the greatest results per unit of expenditure. The manager of a construction company, for example, may have to decide whether it would pay better to get a steam shovel with one man to run it, or to hire ten men and provide them only with wheelbarrows and shovels. It is not always the concern which has the latest or most improved devices that makes the largest profits. Many business houses could do their bookkeeping

more simply and more quickly if someone were to present them with billing and adding machines; but the heads of these businesses do not find it profitable to install expensive machines which could only be used a few minutes each day. The principles here involved are more or less intimately bound up with the subjects of cost systems and cost accounting, to be considered later.

(2) The different parts of a working force must be organized in such a way that each portion of the product, as it is completed, can be passed on to the next set of workers. If any hands are idle because the working up of the product has not been so arranged as to come to them when they are ready for it, there is a loss to the manufacturer, in wages paid but not earned. If, on the other hand, the work comes into one department faster than it can be taken care of, there is a clogging of the wheels of industry, a loss from the tying up of capital, and, possibly a much greater loss from non-fulfillment of contracts. The problems that suggest themselves here will be taken up when we come to consider questions of routing and order systems.

(3) Closely related to the preceding example of combination of labor is that in which each separate portion of the work may be in the hands of a separate class, but in which they all work simultaneously, so that the different parts may be assembled in the finishing process. Any department that is behind hand in its appointed task may delay the work of all the rest; for of course the finished product cannot be turned out any faster than any one of its parts. In many industries, and particularly in those connected

with iron and steel manufacture, unless all departments coöperate exactly at the critical moment, the product will be worthless. This question will come up for discussion under the subjects order of work and routing.

All that has been said emphasizes the fact that, with the growing division of labor and the greater complexity of the problems that are connected with the combination of labor, grows the need of the highest ability and the greatest training and experience for the directing of industry. The great organizer of a working force must have under him an army well disciplined, down to the smallest detail, and must have the ability to mass his forces at just the time and in just the manner that will bring the greatest results. His importance grows apace with the growing magnitude and complexity of industry. Misjudgment or ignorance will now destroy more wealth, and knowledge with wise judgment can produce larger results, than ever before.

CHAPTER IV.

THE LARGE BUSINESS AND THE SMALL.

Of the hundreds of thousands of men in this country who are at the head of a small business at present, there are probably very few indeed who are not striving with might and main to make their plant, or premises, bigger, their sales greater, and their production or trade on a larger scale. The rise of a great business from small beginnings is almost without exception, the history of the vast majority of our great industries. Conspicuous examples of success achieved, and fortunes made, through the enlargement of originally insignificant enterprises stand before everyone, and serve to encourage the small manufacturer to go and do likewise. Few stop to ask how many the failures have been, or what proportion obtains between the number of those who fail and those who succeed. The successes are shouted to the skies, are printed in every newspaper, so that all may know; the failures are printed only in the lists of bankruptcies, and form an interesting topic of conversation only to the disappointed creditors.

A prominent life insurance company has calculated that only two out of a hundred succeed in business. Everyone who stops to think will remember numbers of cases where men who have been success-

ful in conducting small enterprises have decided to branch out and enlarge their plant, and who, not being able to carry on the larger business, have gone to the wall. Men who have succeeded in a small way, fail in a larger field from a number of reasons. The first of these is perhaps because they are not trained; they do not know. Up to a few years ago, it was generally supposed that practical experience was the only guide that would keep men from making mistakes. Nowadays, with the specialization of modern business, it is becoming more and more recognized that practical experience does not, and cannot for the great mass of employes and small business men, furnish unaided the kind of training that is today requisite for large success. Special training in business principles is needed. Then, again, it is erroneously supposed that there is under all circumstances something about a large scale business that must inevitably lead to larger profits and greater success.

It is the purpose of this chapter to point out the advantages that business conducted on a large scale has over a smaller one, and also the advantages of a small-scale enterprise over a large one.

The advantages of large scale production may be grouped as follows:

- (1) It has already been noted that in a large factory there is a greater opportunity for the full use of machinery. Expensive machines cannot be profitably installed unless the output is large enough to keep such machines busy. Many small factories manage to make one machine turn out several patterns and varieties of product, by adjusting it anew

for each change. A saving is effected when the output is large enough, so that a special machine can be kept adjusted for each pattern and size. In the small establishment it is inevitable that some of the machinery cannot be used to its fullest extent, some of it, therefore, will be liable to rust and decay from disuse, and in any event there is a larger proportionate investment of capital on which interest must be earned. In a large factory, where the stock, the material, and the machines are in constant and active employment, the output is greater in proportion to the capital invested, and the profits should be proportionally larger. It remains to be seen, however, whether the other factors of production—besides capital, stock and machinery—can be as effectively organized and utilized in a large factory as in a small. If they cannot, the advantage gained from the more complete and effective use of machinery may be nullified.

(2) It is equally obvious that all the advantages of division of labor can be utilized only in a large establishment. Splitting up the processes of production into more and more minute operations depends for its successful application on an output large enough to keep at least one man fully occupied on each minute subdivision. If now, this one man is tending a machine which multiplies his output very considerably, the size of the business which can effectively use the man and the machine together must increase proportionally. It is clear that a concern which is large enough to use such a man and such a machine, and to put in other machines and other men as new processes are invented, will have a tremen-

dous advantage over a smaller concern. The small establishment is often unable to install new and elaborate machines or to adopt new processes, because the total output is not large enough to devote the exclusive attention of a workman or a machine to a small part of the production process.

It often happens that there is a considerable advantage gained, not only through the possibility of adopting the best machinery and the latest processes, but also through the organization of special departments in which different parts of the work may be carried on. A special department in a large establishment effects economies in organization and management, in machinery, tools, and equipment, in floor space, and in utilization of power, that are not possible where two or three different processes are carried on in one room,—possibly under a single foreman. In fact, specialization of departments is another phase of division of labor, for it allows a single foreman or superintendent to devote his energies to that special part of the production process for which he is best fitted.

(3) In these days of constant change and constant improvement, the manufacturer who is not progressing, who is not lessening his cost of production, who is not finding out new methods and new processes that make for better products at cheaper cost, will soon find his competitor forging ahead of him. Every manufacturer and merchant is experimenting and investigating to find better methods. A concern that is organized on a large scale in these days usually finds it profitable to maintain a department exclusively devoted to investigation and ex-

periment. The small business man is often handicapped by the necessity which he is under, of attempting improvements himself, without the aid and experience of specialists to help him, and without the proper facilities for trying out the new methods before definitely installing them.

(4) In a larger industry, the cost of an office force, of management, supervision, and selling, are relatively less. Up to a certain point it is often true that the force of bookkeepers and clerks and stenographers that are absolutely necessary for conducting the business will be able to handle a much larger volume of bookkeeping, correspondence, and reports, without a proportional increase in number. Division of labor, organization of processes, and division into special departments, decrease the difficulty of supervision in larger factories, where all productive operations are divided, systematized, and made a matter of routine. The foreman who handles twenty men could perhaps as easily manage thirty. Systems may be installed by which the keeping of cost accounts, the tracing of orders, the necessary inspection of results, is made more rapid and easy. In the matter of advertising and marketing products, tremendous economies are often procured, especially in certain kinds of goods for which a demand must be created by effective display advertising, or by maintaining an efficient force of salesman. In these cases, where a certain amount of advertising has to be done anyway, every increase in the output imposes a smaller burden on each unit of the product.

(5) Standardization and interchangeability. It has frequently been pointed out that modern factory

methods, with use of machinery wherever possible, and with great specialization of labor, imply uniformity of production. A machine turns out the same thing day after day, and the advantages of specialization and cheap mass production are derived chiefly from this continual repetition. Products of the same class look alike, and are made alike. Hence there is what is sometimes called **standardization of industry**; that is, the uniform repetition and production of the same type. A vast amount of ingenuity has been expended in recent years in multiplying the types, so that a greater and greater number of products may be standardized. The large establishment that turns out different varieties and sizes of the same product finds it possible to standardize patterns and sizes not in demand by the ordinary run of customers. The smaller concern is frequently obliged to manufacture, under special contract and specification, products which other concerns can standardize.

It should be noted in this connection that few establishments, either large or small, have given strict attention to the economies which may be effected by a more complete application of the principle of standardization, even in lines of product turned out under special contract. It is frequently possible to make some classification by which a number of special grades of goods can be brought into uniformity. In many cases, the standardization of a product can be brought about through coöperation with the selling end of the business. A conscientious attempt may be made to push the sales of a hitherto special article so that the output may be multiplied sufficiently to justify standardizing the production.

Many of the benefits of standardization at present enjoyed only by large establishments might easily be realized by smaller concerns if the matter were given the careful and scientific attention it deserves. There are many cases in which the finished article in its entirety cannot be reduced to standard, and yet the different parts of which it is composed may be standardized. Many times an establishment turning out different sizes and patterns will find, upon careful examination, that many parts which are now made separately for each special order may be made uniform for a large number of articles. This applies particularly to the smaller parts of which an article is composed, such, for example, as bushings, screws, pins, rivets, etc. The methods of determining the range and scope of the economies in standardization which may be effected by establishments, large or small, will come up for our attention again in later pages.

Standard large-scale mass production means interchangeability of parts. Since all complex products are made in minute portions, and since all these portions are uniform in size and shape, one component part is as good as another of the same class, and may be used interchangeably. Interchangeability is an advantage to the consumer, because, for example, if some particular thing breaks in a harvesting machine or an automobile, it can be duplicated at once at a minimum of cost. To the extent that an establishment has standardized all its products and all possible parts of products, it enjoys this advantage of interchangeability. To the extent to which a large-scale manufacturer can carry the principle of

standardization farther than a small manufacturer can, the large concern has an advantage over the small.

(6) A number of other advantages effected by large concerns may be lumped together, under the head of miscellaneous economies. For one thing, the large-scale manufacturer, by buying his raw material in big lots, may secure it cheaper. In the matter of publicity there is an advantage in mere size; for people are liable to be impressed by the operations of a big firm. Customers are liable to think, and rightly, too, that a large house can keep a more complete stock on hand, and when in need of odd or peculiar sizes, will send to the large firms rather than the small. Economies may be made in transportation charges; shipments in carload and trainload lots make possible special and sometimes illegal concessions from express and delivery companies and from railroads.

When all or a considerable number of these advantages can be realized, a large concern is distinctly superior to a small one. There are an infinite number of causes, however, in which the small concern cannot hope to expand successfully into a large one, and from an almost infinite number of causes. Perhaps the most general reason is that many men who are capable of conducting a small enterprise successfully are not equally efficient with a large concern. It is not often that the ruler of a little Iberian village has the brains, foresight, experience and knowledge of men that would make him successful even as the second in Rome. Many business men in enlarging their plant, increasing their working force, and in seeking

a wider market for their products, do not realize the conditions of successful manufacturing may be very different on a large scale from what they were on a small. The apportionment of floor space, the arrangement of departments, the tracing and routing of the product, may all have to be done in a way with which the man is not familiar. A man who can organize a force of workmen and keep them efficiently employed when their numbers are so few that he can come in personal contact with each man, may not be able to do anything at all when he has to reach the men through the medium of foreman or bosses. Last, but not least, he who effectively and satisfactorily supplied the demands of a local market may be totally unacquainted with the conditions surrounding the marketing of products over a wide area. The principles of successful advertising, organizing and training an effective force of salesmen, methods for determining the demand of an unknown territory, and the competition of rival firms—all these are conditions which do not confront the small local concern, but which lie in wait to compass the downfall of the large-scale manufacturer.

The small manufacturer branching out has to consider in addition the problems connected with the larger investment of capital. First, there is the initial difficulty of securing the funds necessary to start a large business. Supposing these to have been secured, the difficulty of procuring the funds of which the conductor of a large enterprise finds himself periodically in need, will depend not only upon the financial resources of the place where the business is con-

ducted, but also upon the confidence which moneyed men have in the ability of the manufacturer.

The larger earnings of a larger business may, after all, mean only that the enterprise is earning interest on the larger capital invested in it. In this case there is no margin of profits. Profits are coming more and more to be regarded as in the nature of wages paid for superior management, and as influenced somewhat by variations due to chance. It is easy to see that if profits, after all, are only wages of management, profits naturally ought to increase in proportion to the difficulties of the problems of management. The difficulties increase with the size of the establishment; and profits will, under normal conditions, grow proportionally if the man at the head can organize and conduct the business successfully. As we have pointed out, the work and problems that confront the proprietor of a large concern are very different from those connected with a small business, and call for a more varied and, in many respects, an entirely different set of abilities. The man who can successfully run a country drygoods store may be utterly at sea if put in charge of a large city department store. Unless he was absolutely certain that he could cope with the larger problems and successfully meet its conditions, he would be unwise to give up his small business for a larger one. In a country town he might succeed in making some profits in a small business, but a large establishment would most probably meet with nothing but loss under his hand.

But it may be asked, if the economies and advantages of a large-scale enterprise are so numerous and so marked, what chance has the small business of

success? In certain lines of business it is true that the small concern is seriously handicapped. It is said that a successful sugar refining mill, one that takes advantage of all the economies of production and organization which will enable it to meet competition from establishments already in the field, cannot be put up on an investment of capital that does not run into the millions. In the steel business the same is true. A new company could not hope to cope successfully with those already in the field on a capitalization of less than \$30,000,000, according to a statement recently made by a competent authority. But on the whole, these are exceptions to the general rule. There are many disadvantages and limitations to the successful operation of a large industry. In most lines of industrial activity, the small business carries on successful competition with its larger rival. Bonanza farms, department stores, and great corporations, each representing large production and complexity of organization and management, yet suffer keen competition from their rivals. Perhaps the most important reason for this seemingly strange state of affairs lies in the fact that the advantages of large-scale enterprise are realized only through trained, skilled, scientific management. The number of men who have the training, skill and knowledge of the principles of successful organization is strictly limited. The few concerns that are scientifically organized cannot supply the entire demand. If the demand is large enough the remaining concerns, no matter how poorly organized, will still make profits.

While the ability to organize a large concern successfully, is very limited indeed, the ability to

keep a small business up to a comparatively high mark of efficiency is much more common. The man of ordinary capacity can keep his mind on the ins and outs of a small business and prevent waste; he can give personal attention to the work of the men he employs, and so prevent the idleness, carelessness and misdirected energy that prove so costly in a large concern not properly managed. Now a small concern well managed has nothing to fear from a large establishment ineffectively organized, no matter what advantages the latter may enjoy by reason of its size. It is significant that the industries in which the small concern cannot hope for success, the industries in which the advantages of large-scale production are most fully utilized,—the industries, in fact, in which we lead the world, are those in which the greatest progress in the science of organization has been made. The manufacture of iron and steel, the refining of sugar, the refining and marketing of petroleum, stand out as conspicuous examples in which all the economies of large size have been realized by a highly efficient organization. In these industries the small concern, no matter how well managed, has no chance of success. Moreover, it should be noted that in these cases, efficient large-scale organization has been extended over so wide a field, and permanently supplies so large a percentage of the demand, that there is little room for the products of unscientifically managed concerns.

Besides limitations connected with the difficulty, and in some cases the almost impossibility, of securing efficient management and organization, there are in many cases absolute bounds beyond which an in-

crease in size, even if accompanied with a corresponding increase in skill of management, will yield no economies, no advantages of any kind. When each man is devoting his exclusive attention to the smallest possible subdivision of the product, even doubling the number of employes will not do more than double the product. In this case there would be a strong tendency toward a proportional loss in output, for the difficulties of organization would be increased without bringing any gain in efficiency. In most industries there is a certain size of plant and equipment that will employ to the fullest all the machinery and men. To make the establishment one-third larger, for example, would mean that some of the new machinery that would have to be installed might have to remain idle two-thirds of the time. If the eye-hole puncher in a shoe factory will punch 6,000 pairs of shoes in a day, and the output is just 6,000, the machine and the man that tends it are fully employed. To increase the output to 8,000 would require another punching machine and another man to take care of the extra 2,000 pairs, yet both would have to be idle two-thirds of the time. When the finest machinery can be kept constantly in use, economy in its employment has reached the maximum. The point of greatest economy differs widely in different lines of business, but in most industries it comes at a comparatively early stage; this fact serves to explain, in large measure, why the small establishment can compete with the large.

Certain other definite disadvantages attend the large-scale business. Factories with a numerous corps of workmen tend to create cities around them.

Land then rises in value, rents go up, taxes increase, and higher wages have to be paid. If all these added expenditures are not accompanied by corresponding advantages due to larger size, profits will rapidly dwindle to zero. Certain recent developments in the silk industry furnish an example in point. In the textile industries it is well known that the economies accruing from an increase in size are limited at an early point. The silk-making establishments, which have for a long time centered around New York in order to be near the market and the source whence raw material is secured, for some years have felt themselves embarrassed by rising rents, taxes, prices of fuel and wages. The output of silk goods has enormously increased during the same period, but it has been accomplished by an increase in the number of plants rather than in the size of each establishment. During the last decade a large number of silk manufacturers have found it necessary to move away from the silk-making center into the mining regions of Pennsylvania, where rents, taxes, and wages are lower, and fuel is cheaper. Small factories can often thrive in small localities where so many of the items of expense above mentioned are lower than in thickly populated districts. Many out-of-the-way places are provided with limited supplies of raw material which would not be utilized if an industry were not on the spot to work them up, in which case they can often be secured very cheaply. Other small concerns thrive because of the possession of cheap though limited sources of power, by means of which they compete successfully in many markets.

Lastly, it must be remembered that the market

that can be reached by one concern, whether it be a factory, a store, or a lawyer's practice, is limited by distance. Heavy products cannot be transported far, except in certain cases in which the articles are localized. Coal can be sent a long distance sometimes, because the coal-fields are restricted to certain regions. On the other hand, cheap and bulky furniture can be made almost anywhere, and the manufacturers of such products must keep their output down to an amount that will satisfy local demands, but no more. In cases of this kind, no matter how large the profits of a small establishment, it would be suicidal to attempt to branch out. The small retail merchant who is supplying the daily demands of a local trade is in much the same position; his advantages over the large department store consists in the fact that he furnishes groceries or dry goods or what not, at the time and on the spot where they are most needed. These utilities of time and place would vanish if he should mistakenly try to reach out for a wider market; what he furnishes is limited by distance. Successful enlargement of his business must be accompanied by an enlargement and a change in the nature of his product; he must supply better goods, make quicker deliveries, keep a larger and more varied stock on hand; the most he can do is to open up a branch store in a different locality. In a word, he must go more or less into a different line of business before he can reach out for greater profits. The limitations of distance will keep the small retailer within even stricter bounds if he is located in a small town, where plans for enlargement must be pursued with unusual caution.

CHAPTER V.

INTERNAL ORGANIZATION; DEFECTS OF ORDINARY TYPES OF MANAGEMENT.

The subject matter of the preceding chapters has been in the main historical and general. Emphasis has been laid more particularly on the broad principles of economic doctrine that have to do with the forms of business enterprise, the factors affecting the productivity of labor and capital, the conditions deciding the most effective size for the industrial unit, the general principles that bear upon business activity in its broader aspects. The account has been far from complete. An exhaustive treatment of this phase of our subject would take us far afield, and would have to cover the whole range of political economy, finance, banking, foreign trade, commercial law, economic resources, labor problems and accounting. To select the prime essentials out of this encyclopedic mass of factors that have a bearing more or less direct on business organization, and to present the principles involved even in a brief and unelaborated form does not lie within the scope of this work. Those who are desirous of making a more complete study of the wider problems that touch so many sides of economic activity are referred to the multitude of excellent separate works on each subject. The

branches of study of this general nature that have been considered in the previous chapters are those which seemed to be most directly and intimately connected with the problems of business organization.

Leaving, now, the historical and general phase of the subject, which may be loosely described as dealing with business activity as affected by outside forces, let us turn to the more specific, and in many ways more difficult problems connected with the internal management of business enterprises. In a sense this may be called a study of the ways and means of making larger profits. It involves a consideration of the methods of organization that will result in a larger output with the same expenditure of labor and capital, or at least an increased output with a less than proportional increase in the labor and capital expense; the methods of avoiding waste and of detecting the weak places in a system; the building up of defective departments; the establishment of cost systems, order and tracing systems, and other methods of checking up that will reveal the points of strength and weakness; organization of selling departments, advertising systems, and problems of general executive policy.

In the beginning, emphasis must be laid on the fairly obvious fact that there exists no perfect body of rules that apply inflexibly to all forms of business organization. Most business concerns have been built up gradually, and the particular skill, training and experience possessed by the men at the helm will often have a tremendous influence on the efficiency of the final form of organization, whether it resembles

one that would work well under average conditions or not. The customs of the firm may be so fixed, the methods so well threshed out by long practice, the knowledge of the management's policy so well diffused throughout the works, that more would be lost through a radical change than would be gained by a system theoretically more perfect. In many concerns, and particularly in small ones, the special skill and personality of men at the head will often compel variations from the type that has been found best in the general run of cases.

There is at present a tendency among men who have become skilled in reorganizing run-down concerns to attach a minimum of importance to the personal factor in management, and to form their reorganizations in as perfect and scientific a manner as possible. They say, and truly, that the pet plans and policies of men in authority have proven the ruination of many an otherwise sound concern; that a theoretically perfect organization is not dependent on the health and continued ability of one or two men; and lastly, that in one case you are going by guesswork and taking a chance, whereas in the other there is no uncertainty. It is undoubtedly true that in the past too much emphasis has been placed upon management by the individual, upon trusting one man to carry all the ins and outs of a business in his head, and too little reliance has been placed in a scientific organization. The individual ordinarily has little influence on the efficiency of large organizations of long standing; but in a small concern, and in one that is newly formed, where lines of policy and of management have not as yet been definitely determined, a

man of force and character, one of exceptional ability in broad grasp and outlook, will often accomplish more as the autocratic head of the business than the most perfect system could do with the man subordinated to it.

The business man who is looking for general principles that will apply with invariable success will meet again and again with instances of plans and systems that will seem to him to involve some universally applicable rule. One finds men everywhere who have read about, or seen in operation, some system or some feature of organization which they have found admirable, and which they proceed to use wherever an opening seems to present itself. The human mind is strongly disposed to generalize; and in business, particularly, nearly everybody has some pet theory, some universal panacea, for the ills that business management falls heir to.

Most men regard that form of organization that is typified by the army, as the perfect one. The ideal division of men into regiments, and companies, the exactly defined duties and authority of the commanders and officers, the precise discipline that insures explicit obedience to all commands of the superiors, suggests to most people the perfection of organized and concerted action. Yet in many business houses too great adherence to the military type has resulted in mistakes in management, because in many cases the necessity for strict control and sharply marked lines of authority is less than for specialization of functions and for the careful combination of different sets of laborers. Now and then some business man comes across, in his records, some signifi-

cant or striking feature of his production costs, and he begins to think that keeping sets of figures represents efficient organization. While this may represent a sound principle up to a certain point, and in certain ways, it cannot take the place of other factors that have to be combined with it to make it even useful. If carried out too far, and applied indiscriminately to every line of work, it may become about as valuable a business asset as a collection of canceled postage stamps.

To many men the word "system" has a magic sound. So much improvement has been accomplished through bringing method and order into a complex set of operations that before had represented only doubt and confusion, and so great a factor is it in checking loose and slipshod work, that there are many who regard everything done systematically as being done economically, no matter how the principle is applied. But like everything else that furnishes a rule to success in business, even system cannot be carried so far as to be an end in itself, but must be used with discrimination.

An example that will illustrate how a mistaken elaboration of a systematic way of doing things may lead to needless expense may be taken from the filing system of a certain mail order house. Country customers of this concern often send in letters containing lists and specifications of a large number of articles. These letters frequently had to be sent out to different departments, sent back with notations or remarks by the department chiefs, and sometimes kept in one part or other of the establishment while the specifications mentioned were worked out. It

was found that many difficulties arose under this plan. The letters were often missing from the files when wanted; and then if the filing clerk could not remember who had it last, a long search through the different departments became necessary. Oftentimes an important letter was lost or mislaid. If the notations were more than could be placed on the blank part of the letter, the necessary information became illegible or was left off altogether.

The difficulties were done away with in the following manner: On each letter, as it was received, a specially prepared tag was pasted, on which was stamped the date when it was received; it was supplied with a serial number, spaces in which to note to which department it had been sent, and to place the date showing when it had been answered and when the order had been filled. In the mailing department an order book was started; in this were entered the date, the serial number, and the name of the writer of each letter as it came in; also the department to which it had been referred. Every time the letter comes back to the office or is sent to another department, the entry in the order book is changed. Thus a careful record is kept of every letter, and the head men can tell in an instant who has had the letter and where it is. An immense amount of time is saved in this particular house to the men who before were compelled to drop important work to run around in a blind search for lost and mislaid letters. The scheme adopted saves money also in that important orders are no longer lost. But would the same system be equally effective if applied to all businesses? As a general rule letters

are not liable to be sent out to different departments, do not run the same risk of being lost or mislaid, and, if wanted, are usually to be found in the files where they were placed when received and answered. In most cases, therefore, this system of pasting on letters tags to be filled out, and of recording them so minutely in an order book, would be a hindrance rather than a help, and would cause needless expense. Yet more than one country merchant has come in, has admired the smooth-running and obvious advantages of this arrangement as applied to this particular house, and has enthusiastically installed a similar system in his own establishment, in spite of the fact that the conditions are different; and the only advantage gained has been the feeling of satisfaction that comes to him from thinking that his business had been improved by the use of system.

All this is not intended to be construed as an argument that no general principles can be applied to organization. The emphasis given here to the diversity of condition and the difference in the purposes of business enterprises is intended chiefly to warn the student of business principles against the tendency to generalize too much, to become biased in favor of one remedy or another without regard to their relative importance. Yet in spite of the great difference in the purposes for which business enterprises are organized, and the great differences in the conditions with which they are surrounded, there are certain factors of organization which apply to all undertakings in some measure or other. We know, for example, that no business can be run unless it is

organized in some way or other. There must at least be some definite method or plan, some mapping out of work, some assignment of duties, or nothing will be accomplished. The work may be poorly assigned, the men chosen to do it may not be the ones best fitted to carry it out, the assignment of duties may result in a slow and cumbersome method of attaining results; but if some plan had been laid out, if the working force know at least approximately what they have to do, an organization of some kind will result.

It is clear from the foregoing that there must be some authority, someone at least at the head, to map out the plan of work, assign duties, and in some measure or other assume responsibility for the work that is being undertaken. We may go even further, and say that, in general, there ought to be definitely marked out lines of authority. The example of a military organization has taught us a great deal of the value of discipline, the effectiveness in administration of placing responsibility, the definiteness of control that is gained by subdividing authority and responsibility. It is fairly clear that in a large organization the man who has control of the general policy cannot be responsible for the successful carrying out of the petty details; the authority and responsibility must, therefore, taper down. The job boss in whose hands is placed the turning out of a small and definitely marked out piece of work, cannot be held to account if the work given to him to do should turn out to be part of an unprofitable undertaking. At the same time, the individual workman who bungles will hardly expect to hear from the

president of the company; he is directly responsible to his job boss alone. The smaller men in authority should be relieved from responsibility except in the fields for which they are fitted. The constant disputes that always arise over methods and ways and means must have a court of appeal, which is provided by the man to whom responsibility for the performance of that particular section of work has been delegated.

Another lesson taught us by the army is in the value of having a properly trained supply of new men to fill superior places that may become vacated. In the army the captain of one moment may have to be the colonel of the next; and in an industrial army the machine room without a foreman may become as helpless as a company without a head. Tapering authority never leaves affairs in such a state that the place of anyone cannot be filled without stopping the machinery of business.

The accurate placing of responsibility is another important factor in organization. There is a great incentive to careful and energetic work if a man knows that everything he does is brought to the scrutinizing attention of his superior, when he knows that credit will be given him for work well done and a black mark be placed against his name if he has failed.

Another great factor in organization, that binds the whole mechanism together, is the introduction of order and method in all parts of an undertaking, sometimes called system. It relieves the man at the head from the details of execution, and lets the man of special skill devote his entire energies to the work

for which he is best fitted. It prevents the man who is worth \$10,000 a year from spending an hour of his time every day opening the mail. It brings to men work fully prepared and ready for their attention, so that they can devote their whole time to the application of their particular function. When everything is moving in a regular and accustomed routine, the waste of time and effort that is involved in starting something new is avoided. System attempts to provide for everything in advance; and instead of making important steps depend upon some man's fallible memory, it makes automatic provision for everything necessary. It arranges the processes so that the greatest use is made of the property devoted to the undertaking and the labor and capital need not remain idle.

In addition to system there must be provision for carrying it out. The discipline that aims at holding all to the chosen system of working is as important as the keeping to a definite plan. Rules and regulations must be provided and enforced, while the proper training and instruction in the features of the system is essential to an understanding and an intelligent application of its principles. Nor can it be assumed that after a system has been installed it can be left to take care of itself. Especially when an establishment has been reorganized upon a new and scientific plan, if minute care is not taken to see that plans and specifications and the details of the new system are strictly adhered to, it will be found that the workmen, the job bosses, even the foremen, are slipping back into their old habits. Watchfulness and carefully planned supervision are necessary to

keep the working force and the superior officers up to the mark and to provide against dishonesty, against errors of judgment and errors from carelessness.

Again, experience has shown that careful records must be kept, that the cost and profits of each article be clearly shown, that the expenditure and results from each department be carefully checked up, so that the business man may clearly see which articles he is making the most profit on, and which department is running least economically. Valuable analyses of costs, operation by operation, should show not only where the profit and where the loss comes from, but should supply invaluable data from which to proceed to the task of reducing costs. The larger and more complex the organization, the greater is the importance of securing accurate cost accounts; for as an establishment grows in size and complexity it becomes increasingly difficult for the man at the top to analyze conditions from observation alone. In days gone by, one heard many tales of the shrewd business man who kept all the odds and ends and details of his establishment in his head and had little need of carefully analyzed cost systems or figures of any kind. That was indeed possible when his only competitors were less clever men who used the same rough, happy-go-lucky system that he used, and when the man who had any organization at all was so much ahead of those who had less or none. The conditions of competition, and the growing knowledge of the essentials of careful organization, are tending more and more to cut down the difference between the cost of production and the selling price.

When this margin was a wide one, an ordinarily shrewd guess often did not fall far enough from the truth to hit outside the profit making limits. Nowadays the anxiety to save a profit that is constantly growing smaller makes rough judgments fatal. Figures of cost of production, covering cost of labor, of machines, and of running departments, must be accurately compiled; these figures must show unerringly the points of high and excessive costs at every stage of the manufacture or business. The failure to gauge a business upon mathematically accurate data may easily result in a mistake that will turn a fast disappearing profit into a loss.

A discouragingly large proportion of the systems of organizations now in existence are permanently prevented from reaching a high state of efficiency, owing to the disputes, disagreements, and constant ill-feeling that pervades all the parts of the body. Disagreement between employers and men are regarded by many able thinkers as inevitable. It is said that the interests of the two classes are permanently opposed to each other, and that the best we can look for is a sort of armed neutrality between the two opposing forces. What the workmen want from their employers more than anything else is high wages, and the workmen feel happiest as a rule when they are doing no more than other laborers in similar lines and yet receive higher pay. On the other hand, employers are most concerned to turn out their products at a low labor cost, and the majority of them experience a feeling of satisfaction if their own workmen are receiving lower wages than those of their competitors. As we shall see later both these con-

ditions should be viewed with apprehension, for they contain the elements of discord, of dissatisfaction on both sides, and lead to working at cross-purposes, to lack of harmony, and to lowered efficiency in the whole establishment.

The question of bringing perfect harmony between employers and men, of keeping both sides satisfied, of making both feel that their interests are identical, and of bringing about a condition of co-operation, is too involved and intricate to be discussed at length in this place. There are a number of theories and a large number of schemes now in operation in actual establishments designed to bring about a spirit of "team-play" between employers and employes, some of which we shall have to consider carefully. It is sufficient to point out at this place that one of the important ends to be achieved by an effective organization is an enthusiastic and unselfish working together of all its parts. It is obvious that the larger the establishment, the greater is the difficulty of bringing this about.

One of the advantages of a small concern lies in the fact that the employer can come into personal contact with all of his men. He knows their family history; he knows the difficulties they have to meet; he can sympathize with them in their troubles, and if a dispute arises he can see their point of view. In a large establishment, all this is changed. The men, instead of having dealings with the "boss" or the "governor," which are often terms of affection, now regard themselves as being employed by some vast machine, which they know as "the company." The company is looked upon as a machine, as an artificial

sort of being that recognizes such things as system, discipline, hard work, but that has no place for anything like mutual interest, working in harmony, esprit de corps. Many managers of even large establishments have attacked this problem of bringing harmony into the interests of employers and of men, with varying degrees of success. Gradually some principles have been evolved which are forming valuable contributions to the science of business organization. At any rate, we can now say that any type of management in which each side spends a large part of its time thinking over and talking over the injustice and the hard treatment which it receives at the hands of the other, must be avoided. The best type of organization is one which calls forth that hearty coöperation on the part of all its members which can only be secured through a genuine, lively and loyal interest in the success and progress of the whole undertaking.

The foregoing paragraphs outline in brief but pretty definitely the factors that should be included in successful organization. They are a definite purpose, superior direction, definite and fixed responsibility, system, and rules and regulations. To this we must add accurate records and statistics, including an effective cost system; and last, but not least, co-operation, harmony, "team-play."

These are the factors that must enter, in some proportion, into the successful management of almost any enterprise; but when we come to determine the comparative importance of each factor, or to consider whether there may not be factors which are essential to some lines of enterprise but not to others,

we begin to realize that the purposes, conditions, and materials with which we have to deal are in no two businesses alike. If we were to attempt to make complete analysis of all the factors by which business success can be achieved, it would be necessary to consider every factor of every business now being conducted, and that, too, not alone but in connection with all the conditions by which it is surrounded and all the influences by which it is affected and to which it has to adapt itself.

There are certain principles, as we have seen, which can invariably be applied in some proportion or other, some features which all organizations have or ought to have in common. As we cannot deal with these principles as they work out under all conditions, we shall have to simplify our task by making use, as far as possible, of types. Probably the most general type and the one with which the largest number of people are familiar, is that of a manufacturing industry. In applying our general rules for organization and profit-making, there are several advantages in using the manufacturing industry as a model on which to rest our principles.

1. Not only is it the one with which most people are familiar, but it is the one that varies the least from all forms of business enterprise.

2. The principles discussed in connection with our typical case can generally be applied to other branches. It will be necessary in the course of our discussion to point out wherein variation in conditions results in different application of principles to different lines of enterprise. It may, indeed, become necessary to devote special attention to certain

lines of business which are themselves more or less typical.

3. In the manufacturing industry the most scientific investigation and experience in regard to the factors that make for efficient organization have been carried on and in this field the most trustworthy results have been secured. If we use this as a type, therefore, we shall tread on more solid ground.

Perhaps it will clear the atmosphere a little, and make our way ahead more plainly visible, if we first consider some of the faults that are to be found in ordinary types of organization. The most general fault of the customary system of management is that the form is not adapted to the conditions and purposes of the business and results to be achieved. It has already been sufficiently noted that the nature of the organization required to manage different types of business must vary enormously. In some enterprises, time is a very important factor. In this case there is need for a better command of affairs by administrative officers, clearly marked-out lines of authority, more definitely placed responsibility, and greater attention to discipline. If, for instance, one were called upon to clear away from a railroad line a mountain of earth caused by a landslide, it is probable that a body of men would be collected and these men would be divided into companies, each with a foreman, and each company be divided into squads, each with a job-boss. All these kinds of units would be headed by men in absolute authority over their units and with no relation to those engaged in other parts of the work that would cause complications or delay. The end to be achieved here is best effected

by a system of management that insures quick obedience to command and effective control.

In the example cited above, the advantages of military organization are obvious. It is perhaps not so obvious that a force of workmen organized to do precisely the same kind of work under different conditions might be more effectively organized in a different way. Suppose that, instead of a track to be cleared away, there is a great canal to be constructed—one that will require thousands of men, and many years of time. In this case, it will be advisable to bring about an organization in which less attention is paid to the sharp division of lines of authority, and more to a careful division of labor, to segregating the different functions of the men so that each one will have the task for which he is best fitted. There are to-day many industrial organizations in which the employer forces into prominence the chief features of the military system, when the purpose in view is much more influenced for good or ill by other forces, when the need for sharp control is less than for specialization of function and the harmonious combining of the different parts. In a great industrial establishment, for example, where machines are manufactured that have a very close competition both as to quality and as to price, the success of this organization depends very little upon sharp division of lines of authority and control, but more largely upon the ability with which the advantages of the division of labor are utilized.

There are numerous examples of this; take the making of shoes. Here there is a division into departments, but the different departments are not en-

gaged in the same line of work nor could the foreman of one department interchange with the position of a foreman of another. The making of the product has been split up into its smallest parts and in each of these small processes the workers are trained to the highest degree of efficiency. In the well-organized shop the workman has sifted from his duties all but the one in which he is supreme. Military virtues are here desirable to the extent that the workman is responsible to his foreman, but this feature is only incidental; it is not the factor that determines whether or not good shoes are to be turned out at a low cost.

The success or failure of the industry would not depend upon instant obedience, upon a definite line of succession in authority, upon interchangeability of position in case of emergency. Rather would it depend upon the narrowing down of processes to make the most of each man's skill and dexterity, upon study and care in purchasing, upon saving time in putting the different parts of the products into the workers' hands, upon keeping every man and every machine fully occupied so as to save interest and rent, upon maintaining an efficient sales agency and advertising policy so as to secure ready market for the product.

It is true that, even in an establishment of this kind, the workers are responsible to the foreman, and the foreman himself must therefore have all the abilities of the workingmen, must be able to do everything he asks them to do, must see that their work is brought to them and taken away; and in addition, must have tact, energy, foresight, good

health, and a number of other qualities. Many of the men who have carried on investigation and experiment in the field of factory organization point out the fact that the duties that must be performed by a foreman constitute in themselves a violation of the principle of division of labor. The man who has all the qualities that go to make up a good foreman is very difficult and sometimes impossible to find, for the duties which he has to perform are of almost infinite variety. Based upon these theories, which are on the whole sound, has been built a system of organization which is almost in direct antithesis to the military type at every point. Briefly stated, the idea is that the duties of the foreman even are divided up among a number of men, and the workman instead of being responsible to a single superior for the faithful performance of all the duties that are assigned to him, is responsible to six or eight "functional" bosses. To each one, of course, he is responsible for that part of his work over which the boss is placed.

This form of organization, known as functional management, will come up for fuller discussion later. It is sufficient to note here that wherever it can be successfully applied, experience seems to show that functional management results in a considerable economy and lowering of cost; so that, as we shall see, in the thousands of cases where it could be successfully applied but is not, the organization is defective in that it does not take advantage of all its opportunities of economy and profit.

Another fault of the ordinary type of management is that there is no method of securing uniform

efficiency in the different departments. In a large concern, it is generally true that one or two departments have been built up to a high degree of efficiency through the energy or special ability of some leader of more than ordinary force of character. As a rule, this leader has risen from some humble position in the ranks until he became the head of his particular division. In this department the greatest economy has been brought about in the use of tools and machinery, the men have been selected from the best types and trained to work at their maximum of efficiency, while systems of stock keeping and cost accounting have been introduced, so that wasteful methods have been eliminated. It may even happen that the profits of a whole establishment are based upon one or two sections that are managed scientifically, while the other departments are running at a loss or at best are not much more than holding their own. A great part of the loss from this state of affairs, which experience has shown to be only too common, can be eliminated or at least discovered, by a system of cost accounting installed throughout the whole establishment, by which separate accounts are kept for each department exactly as though it were an independent concern. Expert reorganizers have run across strange illustrations of the fallacies that manufacturers have been led into through the lack of uniformity in the development of the several divisions of their works, when the efficiency of the different departments was not measured with mathematical accuracy.

Not long ago a certain bicycle firm, taking account of its sales and expenses for the year gone by,

found that there was a net profit of \$100,000. Now the department that had to do with the manufacture of pneumatic tires was believed by the foreman of that division, and by the head of the concern himself, to be the one that was responsible for half the profits. It was decided, therefore, to build a separate plant in which to carry on the making of tires, while the other parts of the manufacture were continued in the old establishment. At the end of a year, to the astonishment of all concerned, the new factory went into the hands of a receiver, while the old was in even better shape than before. The services of an expert reorganizer were secured, and all the accounts of both the old plant and the new were carefully examined and compared. The new factory, run on the same lines as when it had been merely a department of the old, showed a loss of \$25,000. In other words, the old concern had been making \$125,000 a year out of the departments that were retained when the new plant was built, and losing \$25,000 a year in its tire division.

The problems connected with bringing each department up to a fixed standard of efficiency must be left for fuller discussion. The first step toward remedying the fault just illustrated is to find out accurately just which parts of an establishment are showing the best results and which are below the standard. This is secured by a departmental efficiency record in which output, number of employees, pay-roll and costs are collected and compared.

A case contrary to our illustration of the bicycle factory, namely, one in which most of the profits of a whole establishment come from the superior effi-

ciency of a single department, is surprisingly common, even among concerns which are supposed to be well managed. It frequently happens that the able foreman who has brought his particular section up to a high point has been made manager of the whole establishment on account of the special ability shown in his line. An enterprise under such a management will usually show that the one department in which the leader has grown up reaches a high degree of excellence, while the others are indifferently conducted. The manager's success in one department, gained through an intimate acquaintance with all the smallest details of that division and personal training of the workmen, could not be transferred to other parts of the works indiscriminately. It is because there are so few really efficient men, who are generally at the head of great concerns where they cannot come into personal contact with the men and the small details of the separate departments, that the need for a scientific and fundamentally correct system of management is so keenly felt.

The old idea of organization made it a question of men alone, and regarded it as an axiom that if the right man be found the methods could safely be left to him. The scarcity of "right men" and the necessity of spreading the activities of such a one, when found, over so wide a field, brings it about that adherence to the old idea will, in nine cases out of ten, result in glaring examples of inefficiency in those departments with which the "right man" is not intimately acquainted.

The combination of competing firms often fur-

nishes pertinent illustrations of how a single department may frequently provide most of the profits of the whole establishment, while the rest of the plant is at best merely not causing a loss. For many years there were two furniture manufacturers who carried on business in competition with one another in the same field; and in spite of very obvious disadvantages that resulted from their pulling in opposite directions, they could not be brought together.

The real obstacle to amalgamation lay in the fact that each of the heads of the two concerns carried out a line of policy absolutely different from that of the other, and each thoroughly and heartily believed that the other was wrong. Each of these men occupied the position of owner and manager of his company through the special ability which he had shown while in the ranks; but while one had forced to the top through the skill he had shown in advertising, salesmanship, and the marketing of products, the other had come up through the manufacturing end of the establishment. They were finally persuaded by mutual friends and well-wishers to combine. When their books were gone over and compared by an expert cost accountant, it was found that each man had plenty of ground for thinking the other weak and inefficient. The man who had risen from the factory end, it was found, was making his furniture fully 30 per cent cheaper than his rival; the salesman manager, on the other hand, was making up the difference by his superiority in advertising, selling, intimate knowledge of the market demands, and efficient organization of the commercial end of the undertaking. The combination of the two firms re-

sulted in an economical organization in each establishment of the department which before had been poorly conducted, and a consequent saving to the new concern of the large percentage of profits that had been lost when each was independent.

In discussing the defects that are found in the ordinary type of organization, it is, of course, understood that every management must have, in some degree or other, the special factors which we noted earlier as being essential to good organization. To summarize again, we may call them definite structure, lines of authority, definite and fixed responsibility, system and rules and regulations; accurate records and statistics and an effective cost system; and, lastly, harmony and coöperation between employers and men and between different departments. The defects due to a lack of one or more of these factors in an organization have already been partly indicated in the description of them and will appear in greater detail when we come to discuss the best types of organization. The defects discussed under the head of the adaptability of the type of organization to the purposes and conditions of the business, and the unevenness in the efficiency of the management of different departments, are intended in a more general way to outline the task before us. It may be worth while, now, to descend to particulars and to note the faults to be found in the details of the average business.

The average business will be found to include:

1. Superintendent, foremen, job bosses, and workmen. The relation of these to one another and

to the business as a whole, constitute the problems of management.

2. A system of manufacturing, of handling raw material or products, or of carrying on the work for which the business is organized.

3. A commercial end, by which we may designate sales organization, advertising, and methods of creating and reaching the market.

First we have to consider the superintendent. Enough has been said already to indicate the difficulties which are met with when the entire responsibility for the efficient management of all the departments in an establishment rests on the shoulders of one man. It is obvious that an effective management must devise some plan by which the efficiency of all departments is automatically brought up to a certain set standard, and whereby the maintenance of this standard of efficiency rests upon something more solid than the personal skill or intuition of a single superintendent alone. In the functional type of management, this result is best accomplished through a so-called "planning department," hereafter to be described, where the system for the operation of all departments is originated and sent out, and the results are recorded. In the ordinary or military type, the superintendent should come into touch with the foremen of all the departments in such a manner that the skill, foresight, and ability of the superintendent, supplemented by the intimate acquaintance with details and personal contact of the foremen, may combine to bring the efficiency of all departments up to a uniform level. This plan, simple enough on paper, meets with many obstacles when tried in actual ex-

perience and cannot be put through by a cheap or inefficient man. A strong and capable superintendent is, as a rule, cheap at almost any price. The advantages of having a capable superintendent who surrounds himself with efficient foremen to advise him upon important subjects, will bring to a concern unexpected advantages besides those which are obvious. It gives the foremen an opportunity to add to their knowledge of the affairs of the business and gives them a broader outlook upon the results to be accomplished, so that they are better able to work toward the end in view. Then, again, a foreman who is called into consultation with his chief is stimulated to good work by the opportunity thus afforded to bring his results to the immediate notice of his superior. In the ordinary system, the foremen peg along by themselves; they are frequently actuated by feelings of jealousy toward one another; by grumbling and fault-finding they weaken their own efficiency and that of the entire plant. With proper management they can be moved to coöperate with their superintendent, with each other and with the men under them, for the good of the firm.

Next to consider are the foremen. The question of securing efficient foremen, or of getting the work that belongs to them efficiently done, is becoming increasingly prominent as the most difficult problem in the science of business organization. With the tendency of the age toward specialization in work, it is becoming more and more obvious that the great variety of qualities demanded in a foreman, and the large range of duties that he is called upon to perform, present an almost insurmountable obstacle to

the problem of securing the most efficient and economical performance of a foreman's functions. These are the men who come into daily touch with the workers at machine and bench; to them belongs the responsibility of securing the maximum results from the labor force; on them falls the task of bringing out the greatest possibilities of the machines—matters which can be determined with mathematical accuracy (as we shall see later), and with which very few of the ordinary type of foremen are acquainted. Yet in the ordinary run of establishments the foreman is simply a machine hand or job boss, who has been promoted because of his energy, his desire to please, or because he has long years of service behind him.

The person selected for this important position may have only a knowledge gained from the running of his machine, when as a matter of fact he should be thoroughly skilled in the methods of modern scientific machine practice, should be in touch with the most modern mechanical processes, should know the best methods of handling men and of getting the best results from them, and should be able to supervise the timekeeping and fix the rates of pay. More and more it becomes evident that profits depend upon the selection of foremen of a much higher grade than has in the past been recognized as necessary.

The standard set is high, and there are few men who can perform efficiently and economically all the duties that their position calls for. At least it may be said that in most concerns the foremen should be selected with much greater attention to the fitness of their qualities and training for the work that they

have to perform. Some experienced students of this subject, indeed, maintain that the variety of work that falls to the lot of the foreman is so great that it is impossible for any one man to put it through in the most efficient manner. In the best organized establishments of to-day there is an increasing tendency to take away from the foreman many of his functions, such as determining the speed of the machines and the types of tools to be used, fixing the rates of pay, and other things. This plan of dividing the functions of the foreman up into separate operations and putting each function into the hands of a man who is skilled in his line, will bring great economies where it can be instituted. It seems limited in its application, however, to manufacturing concerns of considerable size where great masses of product uniform in type and pattern are turned out. In many cases the more elaborate plan cannot be carried through, and as a matter of fact it is only rendered necessary by the weakness of the ordinary type of foreman. In the average establishment the same economies can be achieved if the foremen are selected with care, if they are trained sedulously in the various duties they have to perform, if they are stimulated to do their best in coöperation with the superintendent and the other foremen, and if they are made to feel that good work will be instantly recognized and rewarded.

Last come the workmen. Probably there is no problem connected with business organization that needs so much attention and careful study as the scientific management of the workmen. There is no question that the average man, whether he be

millionaire or day laborer, is inclined by nature to take it easy. It is only as a result of example or external stimulant of a powerful kind that a man can be induced to work at a more rapid rate. The result is that in a surprisingly large number of cases the workmen are loafing along at an easy gait and efforts made by the management to get better results are so poorly directed that the workmen increase their efforts only in the direction of making a brave show of working at top-notch speed. The common tendency to "mark time" is, as a rule, considerably increased wherever a large number of men work together at similar work and uniform standard rate of pay per day. Whenever this happens, the better and more energetic men are forced almost to slow down their gait to that of the weakest and least efficient. The workmen as a rule, are inclined to look with suspicion upon any man who is obviously attempting to outstrip his fellows for a number of reasons. First, it is believed that there is only so much work to be done and if one man does twice as much as the average his work will tend to throw an average man out of employment. Second, the presence of a man who is doing extra well furnishes to the employer an argument why all the other men in the shop should follow his example. Then, too, when a naturally energetic man works for a few days alongside of a lazy one who is getting the same pay, he cannot help feeling that half of his hard work is going for nothing.

The remedy for this state of affairs will occur to anyone; namely, that the reward should be proportionate to the work performed. This desirable state

of affairs has been sought generally by the installation of piece-work system. In theory, payment by piece-work is intended to give the workman a direct share in any increased production which he may bring about, by more intelligent or increased exertion. As applied in most shops, the piece-work system results in high labor cost to the employer, little or no increase of wages to the employe, and consequently very little satisfaction to either side.

Thus we see that whether the labor force is working under ordinary day work or on piece system, there is an equal temptation to idleness and an equal tendency to reduce the profits of the employer through high labor cost. Manufacturers, business men, and students of labor problems all over the country are showing a lively awakening to the great losses that have been needlessly suffered under the prevailing system of paying wages, and the different plans that have been devised to remedy the situation under varying conditions will demand careful consideration. Under conditions as they exist to-day the foreman sets prices by methods strictly their own; the employer suffers continued losses through high labor cost and limited output and the workman idles away his time at machine and bench as the only way open to him to get even with the management for its unfair treatment.

The defects of business organization which are connected with manufacturing, with handling the stock, or with carrying on the work for which the business is organized, may be traced to three sources; namely, carelessness or ignorance in regard to system, to accounting, and to manufacturing methods.

Let us begin with those specific faults of system which are connected with the handling of the raw material or product in the establishment.

Almost every business man makes a practice of taking an inventory of his stock on hand at least once a year. This is usually accomplished by a complete or partial shutting down of the business for several days, and does him little good except to show him what stock he has on hand and how much he has made or lost at the end of the year's operation; yet it is not only entirely practicable, but very profitable, to make an inventory each month of the stock bought, sold and on hand. Such a system will prevent large purchases of goods which must remain on hand for a long period of time, unnecessarily increasing the amount of working capital required and the charges for interest.

Another fault of system is connected with the tracing of products in their progress through an establishment. Few concerns realize the necessity of keeping accurate records, showing exactly which point has been reached by the unfinished product, how far it has advanced in its way toward completion, and how soon it may be finished. Yet the failure of more than one concern has hinged upon its tardiness in filling orders and fulfilling its contracts as to delivery, which might have been avoided by careful attention to a system of tracing stock. Like the monthly inventory system, this plan also will affect a saving in the amount of capital invested: it will show, for example, if any products are lying idle because no provision has been made to finish them,

and in any case a good tracing system tends to keep stock moving.

Something has already been said as to the great importance of the cost system in keeping the efficiency of different departments up to a uniform level. But a thorough-going application of system to the problems of cost of manufacture must not stop here. Most types of management are lamentably lax in the matter of keeping accurate records of the work performed by the individual laborers. Yet if this be not done, the business man will find himself up in the air at the very outset of any reorganization aimed to reduce cost of production. A campaign of this kind must usually start by increasing the efficiency of the working force and eliminating the inefficient men. If the individual records of the men are not kept, there is no basis except guesswork on which to start campaigns of improvement.

Another advantage of great importance to be gained by keeping individual records for the workmen is the effect of such records upon the workmen themselves. The man who knows that an accurate tabular account of his value or his incompetency is kept and carefully inspected by his superiors, will be under a much more powerful incentive to do good work. If, in addition, increase of pay and chance of promotion are made directly contingent upon good records as shown in the cost sheets, the tendency toward idleness or slovenly work, even under an unsatisfactory or antiquated system of pay, will be materially reduced.

It is hardly necessary to point out that every manufacturer, in these days of close competition,

should keep an accurate itemized account of the cost of every article turned out. The advantages of so doing are too obvious to need comment and yet how many failures are caused by nothing less than the selling of products at prices lower than the actual cost to make up the goods. Manufacturers should be able to tell at any time the cost of any article made; should have records showing how much an unfinished article has cost up to the present and how much more it will cost to finish it. It is by such records alone that he will be able to keep within proper limits his costs of production.

Defects in manufacturing methods, such as can be brought into a general discussion of business principles, must be limited to a consideration of how to get the best results from the coöperation of machines and men and in assembling the final product. A lack of scientific management in the matter of cost system and payment of wages will invariably lead to weaknesses in the economical handling of machines and tools and the processes of production. It is astonishing to find out what a lack of information there exists in regard to the amount and kind of work that may be turned out from the proper use of machines. In fact, there are very few establishments in the country where sufficient experiments have been carried on to show exactly at what speed, with what power and under what conditions a machine will turn out the most work. In most cases this very important matter is left in the hands of the foremen, who, without knowledge or experience as to the methods of finding out what can be done, make what they think a shrewd guess and let it go at that.

Even worse, the foreman sometimes leaves the whole matter to the individual preference of the workmen. If defects of this kind were not so widespread in general, one would wonder that ninety or ninety-five per cent of the manufacturers of the country do not go to the wall. For success, it must be remembered no company need be better organized than its competitors.

The methods of accurately determining just how much work a machine is capable of turning out under best conditions need not be discussed at this point. It may be well, however, to point out by an example or two just what is meant. Suppose that a foreman superintends twenty men shoveling sand, and wants to get the best results from the use of the shovels. Now, one might think that good results would accrue from letting each man use a shovel of the size and shape that he might prefer. Experience has shown, however, that the best results are obtainable only by experiment. The men should be provided with shovels of different sizes and shapes, and each of these should be employed for a certain length of time. On each variation of pattern and size, accurate time measurements with a stop watch, measuring say the time required to fill a wheelbarrow, should be recorded. The comparison of all the statistics so gathered will show what should be the shape of the shovel, and how much it should hold if the maximum results are to be secured. A certain contractor in Massachusetts carried on experiments for three years with different shapes and sizes of shovels, and discovered that one containing 22 pounds measured the scientific load on which the average man can do

his maximum. It need not be pointed out that, side by side with this process of selecting the proper shaped tool to be used, there should go on the process of selecting also the proper men. This may be done by keeping individual records of the work of each man, as already pointed out.

In the case of machines of more complexity than we find in the simple pick or shovel, the securing of scientific results is not so easy, but is correspondingly more important. The difficulties are increased here by the large number of variables that have to be considered. In recent years, extensive investigations have been made in regard to machines for metal cutting. It was found that the variables to be considered in this case ran about as follows: 1, Shape of cut; 2, kind of metal being cut; 3, shape of tool; 4, kind of steel in tool and metal; 5, depth of cut; 6, power of machinery; 7, rapidity of turn; 8, effects of soda water or other cooling chemical.

From what has been said, it may easily be seen that the ordinary type of foremen, anxious as he may be to do well and to make a good showing, has no means of securing the necessary training and experience to bring about the proper results. When such matters as cutting speed, depth of cut, angle of cut, and other important variables are left to guesswork, it is no wonder that upon scientific investigation, losses of fifty and sixty per cent in the efficiency of machines are found. For many types of machinery, careful investigations by skilled engineers have already been made out and results tabulated. The foremen should be acquainted not only with the methods of securing scientific data of this kind, but

should be trained to recognize the value of and use such results as have come or may come to their hands.

The situation relative to the use of the proper machining methods is well illustrated by the experience related by Mr. C. U. Carpenter, in his book on "Profit-making in Shop and Factory Management." "I recently installed," says Mr. Carpenter, "in certain factories several large boring mills and heavy planers, built by two of the highest grades of manufacturers. In order to test the amount of knowledge possessed by the manufacturers of these machines they were called upon for advice as to the best results that could be secured from them when working under differing conditions. Simple questions were asked as to the speed and depth of cut possible in order to secure the best results. These builders of the tools could not give a definite answer that would be of any material assistance to anyone needing light. They knew that their machine tools 'ran as fast and would turn out as much work, etc.,' as any in the market; but when it came to the question of shapes of tools, depth of cuts, results upon differing grades of metal, results from the use of water and composition on the tool, and so on, they floundered hopelessly. The lack of knowledge of the best results obtainable is not by any means confined to the older types of shops. There is many a factory to-day which to the eye presents a modern appearance, with its new buildings, well-ventilated and cleanly, its fine equipment in machinery and tools, and its show of bustle and hustle, which yet needs the doctor's care badly."

With foremen so utterly unversed in the fine points of their work, can it be wondered at that expert organizers often find differences of 30 per cent and more in the working efficiency of the machines under different men, and report establishments where the best guess made as to conditions of maximum output falls twenty or twenty-five per cent short of what it should be.

There is little need to dwell at length on the shortcomings that make their appearance in the commercial ends of a business—the buying, and particularly the selling, departments. Business enterprises differ so greatly in this respect that it is difficult to pick out any features that will be common to all. To some kinds of business houses the buying and the selling are the whole thing—the retail department store, for example, is organized for no other purpose than to buy and sell again, its services consisting only in adding utilities of time and place to an already manufactured product. Nevertheless it is true that there is hardly any business enterprise which does not find the purchasing of raw materials, machinery, furniture, and so on, and the selling of a finished product very important parts of its functions. In the early days of the handicraft system it was the practice for the customer to bring raw material and pay for having it worked up. Nowadays all business enterprises buy something and sell something again.

In regard to the buying department, the defects in most concerns can, as a rule, be reduced to two. First, it is liable to degenerate into a “dickering” department, filled with men who have great faith in

their powers of bargaining, but who unconsciously cost their company thousands of dollars through developing the wrong kind of qualities and knowledge. Strange to say, the importance of the purchasing department is underestimated more than that of any other in the majority of cases, in spite of the fact that one would think that heads of business firms ought to be more keenly alive to opportunities for effecting economies and saving profits in the buying of materials than in other less obvious ways. Clearly it is impossible for one man to possess all the technical knowledge necessary to enable him to select just what is required in relation to the ends to be accomplished and the surrounding conditions; yet we find employers curiously indifferent on this important point, and buyers as a rule concentrating their energies on driving a close bargain, with little regard for the value to the firm of the articles for which they are bargaining.

What is needed in many cases is a full and complete system of instruction sheets for buyers, compiled and inspected by the heads of the departments who are most intimately acquainted with the nature and specifications of the articles needed. The buyer should have full and complete information as to where he can find out what he needs to know, and the value of his work should be judged not by what kind of a price he has secured but by the closeness with which he has approximated meeting the specifications required in the article purchased. By these means mistakes such as the one made by a buyer for a certain manufacturing plant will be avoided. This man had a great deal of confidence—

not unjustified—in his ability to force down prices. Instructions were sent to him to purchase a large lot of steel shafts of certain size to be used in the manufacturing of a machine product which his firm was turning out. He proceeded on most approved lines to secure bids from several different firms; and by playing one off against the other, he finally purchased them at a very low price, and moreover secured an immediate delivery. Shortly after that he was called into the manager's presence to receive, as he supposed, commendation for his good work. What was his surprise, therefore, to be met by a sour countenance and the cold statement that the firm was out several hundred dollars on his bargain, for the simple reason that soft steel shafts would have served the purpose as well as the high grade hard steel ones purchased. The manager blamed the buyer for not knowing what was wanted, and for making no effort to find out; the buyer blamed the department head who had sent instructions so vitally defective.

Both were right. Information as to purchases should be set down clearly and unmistakably, and in such a way that the buyer can co-operate with every department intelligently. On the other hand, the buyer should be trained to consider that the most important part of his duties consists in following instructions intelligently, in being certain that his information as to purchases is absolutely accurate and in keeping in touch with the various departments so that he will know at least the outline of the processes of production and what kinds of materials will meet conditions.

Another important part of the buyer's duty is to keep in touch with what there is in the market, how it may be secured, and what relation these products may have to the needs of his firm. The buyer, as well as the management itself, should be extremely well posted in regard to the latest processes of manufacture and the latest improvements in tools and equipment. The makers of tools and raw materials are ordinarily under a double temptation to persuade the buyer to stick to the old ruts and follow precedents slavishly.

In the first place, if improved processes have created a demand for a new kind of tools and equipment, the makers of these things are naturally anxious to dispose of the old stock and will make the strongest kind of appeal to the ambition of a buyer who wishes to acquire a reputation as a shrewd and clever bargainer.

Second, raw material and tool and equipment manufacturers seldom find it to their interest to encourage the adoption of new processes or a demand for new tools. They have money tied up in old patterns, in old stock, in machines going through the process of manufacturing, and in their own equipment. Changes of a radical nature would prove a serious matter to them.

Moreover, it is too often true that the progressive firm, the one which stands immediately in readiness to adopt improvements and make desirable changes, finds itself alone in the field. Until the demand of this firm for new tools and equipment has been supplemented by that of sufficient others to compel the manufacturer of such products to turn

them out on a large scale, every effort will be made to induce the progressive management to stick to the old. If improvements are to be put through, the buyer must be taken into the manufacturer's confidence, must be made to see exactly what it is intended to accomplish, and must be fortified against the attempt of other firms to sell him something different and against his own ambition to make his name famous as a shrewd bargainer.

Another mistake often made in connection with the purchasing department is that of giving to this department charge of the receipt and storing of materials. It is true that in many cases departments cannot be sharply divided off in such a way that there is a separate division for every small function of a firm's necessary operation; but the importance of separating the purchasing department from that which has charge of the receiving and storing of the incoming stock is not often realized. The accounts of the purchasing body and that of the receiving department must be kept absolutely separate if the management desires to avoid not only confusion and waste, but absolute dishonesty. If the purchasing body is given charge of the care of material, the opportunity for graft is too immediate and too tempting for even the most honest to resist. There is not only in some cases the danger of having things carried off and "lost,"—I almost said strayed or stolen,—but it becomes the easiest thing in the world to devise an amalgamated system of bookkeeping by which things are really paid for, apparently received, but actually never seen in fact. The experiences of receivers and expert accountants teem with instances

in which the whole purchasing department of an apparently well-managed concern is honeycombed by a system of private rebates, corruption money, and "doctored" accounts. There should be a divorce effected between the purchasing department and receiving department to prevent such collusion; and this rule should be followed, no matter how small the plant.

At the other end of the commercial function of a business, appears the side which has to do with the marketing of the product. The most crucial defects connected with the marketing of the product appear in the methods of the sales department. Few business men are aware of the possibilities that lie in the scientific development of this end of the concern. The prevailing impression is that salesmen are born and not made. It cannot be denied that this impression is not without foundation. A certain great politician once said of his father that he was the best silk salesman in Massachusetts. It was true that he knew very little about silk fabrics, but he had about him that impressive personality, that individual magnetism, that pushing force of character, which made people want to do what he wanted them to do.

If the sales manager can collect, organize, and send out a force of such men, well and good. The trouble is that most managers, in attempting to do this, run across the same sort of difficulties that would be met by a man attempting to organize a company of ex-presidents, or that Frederick of Prussia encountered when trying to form a regiment of eight-foot soldiers. The ordinary salesman must form an effective member of a fighting or a selling

force, not because he is a giant, but because he has the training and knowledge and skill requisite for fighting or selling. Few sales managers realize the gulf of difference there is between a man who merely quotes prices and waits for something to happen, and the man who sells the goods over his competitor's head because he can talk the business. Innate selling ability need not be entirely disregarded in hiring men. The organizer of an army, though he cannot rely on eight-foot regiments, does not on that account accept weaklings; but an inborn selling personality must be bulwarked by a thorough training in all the talking points of the product to bring the best results. The good salesman should know all the faults, and the good points as well, of rival products; he should know beforehand all the objections he will have to meet; he should have from the experience of all the best men who have been over the ground the most successful methods of displaying the merits of the goods to a prospective customer.

Lack of system in this department, as in many others, is often the stumbling block in the way of best results. The manager who will employ a new salesman, give him a few samples and a pricelist, and send him out to do business, need not wonder if the territory is not being covered or the customers not being reached. The first requirement is thorough and organized training of the selling force. Next, the records returned by the salesmen should show at once whether the ground is being covered, whether all possible customers are being handled, and whether competition is being met. In far too many firms the salesmen are encouraged to compete

against one another, under the false idea that such a system will so stimulate them that the largest volume of sales will be recorded. This system often brings it about that the salesmen become jealous and distrust each other. They have no idea at all of pulling together for the good of the company, and worst of all they keep jealously to themselves whatever knowledge they have gained, which for the company's good ought to be shared by all. The results that have been achieved by scientific development of proper methods of sales management have proved that this subject is worthy of the most careful and painstaking study.

The defects of business organization that have been outlined show that, from a broad point of view, the problem before the business man is twofold in its scope. Before he can apply his knowledge of how to correct faults, he must first know what is wrong. The every-day business man plunges along in the dark, unprovided with the information that proper organization, system and methods would bring to shed light on his path. His buying department may be in the worst kind of confused and leaky condition, but he does not know it; the factory methods may be costly in the extreme, but he may not know why, or how to better them; his salesmen may be blandly quoting prices, while his competitor writes down the orders secured by a trained selling force. Worse than the man who realizes where his losses come from but does not know how to stop them, is the executive who does not realize the inefficiency that prevails in all the divisions of his establishment, and who cannot see beyond the fact that profits are on

the thin edge which divides a plus quantity from a minus quantity.

Such a one should go into his business thoroughly. He should attempt to discover, first, if all the factors that go to making a strong organization are present in his concern. Then he should trace out, one by one, the weaknesses that are found in so many of the average plants. Lastly, he should compare his business with a successful one in the same line, choosing for this purpose one in which the foremen are trained in the latest and best methods of handling men and machinery; in which the workers are happy in giving their best energies to further the company's progress; and in which "system" in cost methods and reports not only discovers the weak places, but points out the lines of progress, prosperity and profits.



CHAPTER VI.

MILITARY ORGANIZATION.

A detailed account of what is meant by the military type of organization is hardly necessary. The idea is borrowed, as the name implies, from the divisions of the army. The ideal type involves three features:

1. Division of the workmen into companies, of companies into regiments or departments; and so on; each smaller unit being comprised in a larger.

2. A similar division of the executive and administrative force; that is, the superior officers.

3. Clearly-defined duties, exactly graded authority, and carefully modulated responsibility on the part of all the members of the organization.

The industrial army is patterned more or less after the military type. There are divisions of men into separate departments. These larger units may be still further subdivided into smaller units, and the smaller units again may be marked off into "gangs." So, too, with the officers; there must be an executive head or president. Under him come superintendents, managers, foremen, and job bosses. But it must be understood that the functions of the industrial army and of the fighting machine are en-

tirely different. With the latter, the product comes in one supreme moment; the whole success or failure of the military organization is shown by its effectiveness at a critical time. For this reason everything in the military system is subordinated to obedience, to certainty and definiteness of procedure, and to immediate response upon command. Moreover, in the military organization, the parts are, upon the whole, interchangeable. The leader of one division may be transferred to another without serious danger of loss of efficiency. Now, the product of the industrial army flows, as a rule, in a continuous stream. As there is ordinarily little need for the severe line in which everything is sacrificed to instant obedience to command and certainty of procedure in emergency, there is no need for the workers or the officers to be interchangeable; and the flow of product is increased by the specialization of effort and the application of the principles of division of labor in the management.

So much we already know. It is understood that there can be no industrial organization founded exactly upon the military type, because the purposes of the two are so entirely different. Neither can an organization depart entirely from the army pattern because, after all, there must be a head or executive to direct affairs; there must be officers and lines of command and responsibility; there must be divisions of workmen into smaller units and tapering authority, in any industrial organization.

It is evident that no hard and fast lines can be drawn. There are, however, many business enterprises in which the military type predominates, in

which quick obedience to command and sharp lines of authority are essential to carrying out the purposes of the organization.

There are some enterprises in which the product, if it does not exactly come in an emergency or in a sharp crisis in which the organization stands or falls according as it can be immediately controlled and shifted about, still may require to be put through in the shortest possible time or within a certain time limit. In such an enterprise, usually all hands must turn to the accomplishment of a single object; parts of it that might be produced far cheaper if there was plenty of time to train workers and build machines for the production of those parts, must be brought into existence at once by the unskilled members of the regular army. What is lost in the greater cost of production may be made up in the time saved.

It is true that, in most lines of business, time enters as a factor. Contracts have to be filled, work rushed through; parts may have to be constructed without so much regard to the cost as to the time saved. As we have seen, too, all organizations partake more or less of the military scheme. We shall be compelled, therefore, to apply the term military to all organizations that are built more distinctively on division into units, tapering responsibility and authority of officers, and, in general, the features that remind us forcibly of the army structure.

The other kinds of industrial organisms, those from which the military features are not indeed absent, but in which they are subordinated to other things,—to deliberate production systematized in all its details for the lowest construction cost, and par-

ticularly to division of functions in the management, —we shall consider a departure from the military type.

It is fairly evident from what has been said, that in proportion as an organization adheres to the military type, there is a gain in quickness of evolution and operation, but a corresponding loss in the cost of production. The alliance between lengthened processes and cheaper cost of production represents a truism that has pervaded all our economic life since the beginning of time. The Indian woman who grinds her own wheat into flour between two stones goes through all the processes necessary to turn grain into meal in a few minutes. Yet if all the flour of the civilized world were ground that way it would verily be worth its weight in gold, so great would be the expense of making it. As it is, months and even years ago there were started the operations that have combined to produce the 50c sack of flour that comes from the grocer's. The iron and framework for the grinding machines, hoppers, elevators, bins, and so on, had to be mined, molded and put together many months before the actual process of making flour was commenced. The grain has been transported long distances, has gone through hundreds and even thousands of hands, and has undergone many changes in many processes before the flour appears at your door.

As in the economic world, taken as a whole, so it is in individual business enterprises. If colonists on a small island were in immediate need of meal and flour, and had a supply of corn and grain, they would take steps to produce what they wanted in the

quickest possible time. Little attention would be paid to division of labor, to training special workmen in the smaller subdivisions of the operations, to installing machinery and securing the maximum output at the lowest cost. If any organization at all were attempted, it would closely resemble the military type. The workers would be parceled out into divisions, each with a chief; and these divisions would be divided into squads, each with a foreman. All formalities, system, and "red tape" would be omitted. The accomplishment of the end in view, namely, the immediate production of the flour, would be given precedent over all considerations of cheapened—but more lengthy—processes. So, too, the miller, if there were a famine in the land which demanded instant increase in the supply of flour, would very probably give up his plans for installing new processes and new machines for a time, would make sharper lines of authority among his foremen and bosses, and would specialize not in the direction of cheapness but of speed.

There are a large number of organizations to-day whose functions demand careful attention to this question of speed of output. This is particularly true of building and construction work, the erection of light and power plants, bridges, amusement parks, and similar work. It is true of businesses that have to make special products of such a nature that they cannot be standardized, or turned out in large amounts of a single pattern. It is often true of excavating and wreckage work, and, in general, of work that is not likely to be frequently repeated. The same is generally true of establishments whose prod-

ucts are easily affected by changes of fashion, or who must be in readiness to seize the opportunities for profit offered by exceptional sudden demands for certain products. In all these cases it may be necessary to give less attention to such specialization of effort and cheapened processes of production than other situations would demand; it may pay to take chances of less thorough deliberation of plans; the lines of authority may be more sharply defined, so that questions may be decided quickly and no time lost in referring dubious matters to men higher up for confirmation. An organization of this kind is equipped to secure dispatch at the cost of economy in details.

It is sufficiently obvious to anyone that there will be a distinct loss in efficiency if an organization does not conform to the type best fitted to the end in view. Suppose, for example, a peculiar style of hat-band should come into fashion during a summer season. It would be possible to manufacture these in a most economical manner so far as cost of production is concerned, by installing new machinery, devising the process most saving of labor and material, putting in specially skilled designers, dividing the processes of making the product into the smallest possible operations, and training workmen to a high degree of skill in each subdivision of the work. By the time all this organization and system had been built up, the manufacturer would be in a position to turn out the kind of hat-band required at perhaps one-half the cost per unit of product that his competitors must pay with other methods. Yet long before he was ready to put his product on the market, other

firms would have satisfied the seasonal demand. His special machinery would be worthless, his specially trained workmen and designers would be organized for the production of a product for which the demand had ceased. The prize and the profits would go to those who had been organized for dispatch rather than economy. The manufacturers who had used their old designers, who had whipped their old force into line, though without special training, for the immediate production of the new article, who had specialized in the direction of quick hat-bands rather than cheap ones, these would reap the harvest of profits.

The case just presented is an extreme one, but it contains a valuable lesson. Nothing could be more instructive in this connection than the history of the firms that were called into being by the craze for bicycle riding in this country a few years ago. The first bicycles were made by general manufacturing firms, not especially equipped for turning the product out in large amounts. As is well known, prices as high as \$125.00 and more were paid for the earlier machines. As time went on, more and more of the parts of which a bicycle is composed became standardized, and could be turned out in large amounts. Prices went down. Firms were organized to make a specialty of manufacturing bicycles. Gradually the military type of these organizations changed in many cases to a structure laying most stress on great specialization of labor and machinery. Great plants were built, in which such functions as designing, buying, selling, and so forth were segregated, and every advantage was taken of special knowledge and skill,

so as to turn out bicycles at a low cost. But the firms which abandoned the military structure were brought up short when the bicycle craze moderated its intensity. The heavy investments of capital, and the long and carefully-built-up organization, so well fitted in the end to produce bicycles cheaply, were not only turning out a product for which there was no demand, but were unfitted to produce anything else. Those who wisely kept their heads and the military structure, were in a doubly better position than that of their rivals. By the quicker, if less economical organization, they seized the first profits of the temporary demand. When the demand died down, their organization of machinery, workmen and equipment, which was not so highly specialized and was capable of quick evolution, could be applied without much loss to the production of articles similar to bicycles,—to motorcycles, automobiles, and the like.

Illustrations of the disadvantages of not adhering to the military type, under certain conditions, must not be taken to mean that there are not other conditions under which it is fatal to retain too many of its features. The opposing form of organization, known as “functional,” offers so many attractions in the way of lowered cost of production and high profits, that many expert organizers, who have met with success in abandoning military features almost entirely, advocate “functional” management unreservedly. They say that there is an immense loss in efficiency, the country over, because of inefficiency on the part of foremen, superintendents and managers, since the duties of officers in charge are so widely

different and various that no one man can perform them all satisfactorily or economically.

It is hard to deny that much of their contention is true. Wherever it can be applied, functional management is a tremendous saver of costs. But as we have seen, there are many kinds of enterprises where success lies in other directions than mere lowered cost of product. Then, again, functional management can be successful only in a very large establishment manufacturing standard articles little subject to change or variation. Lastly, as we shall see, military management is not inconsistent with very considerable specialization of skill and effort on the part of the workmen, with best and most modern machines and processes and methods of manufacture. The vital spot where it is said to be weak in the matter of economy of production, as compared with the functional type, lies in the foreman system. The ordinary foreman and manager cannot possibly know all of the factors that make for efficiency of production, it is claimed; and even if he could know them, he has so many duties of such different kinds to perform that no man could do everything efficiently.

How this is taken care of in the case of functional management, we shall see later. The truth remains that the majority of establishments in this country are based on the military type. It may be true that many of them are military because proprietors do not know any better system; never, perhaps, even heard of any other. Wherever practicable, the functional type is better; but it is practical and safe in so small a number of cases at present, that the problem before the average business man relates to the develop-

ment of his business as it is to its fullest power and possibilities of profit. Even in cases where functional management is hoped for ultimately, the first steps must be toward correcting the many and costly defects of the ordinary type of organization. Division of functions and specialization of skill in the management represent a final stage which may well be applied after a thorough and effective analysis of the economies that may be introduced in other lines has been made.

In taking up this line of study, it will be necessary to go back to our fundamental type—the organization of an industrial manufacturing concern. It will be understood that the problems of every business man vary with the conditions of his business. It may be that those who are engaged in an enterprise in which conditions are widely dissimilar from those of a manufacturing concern will not at first see what particulars in the study now to be taken up contain valuable information. Yet as we have seen, there are many points of resemblance in all business enterprises, and there are certain features that must be applied in all successful organizations. Each man that wishes to conduct his business in the most economical way, to increase his profits and extend his influence, must give the closest attention to a careful analysis of his own methods of operation. Yet it will give great assistance to anyone to have examples before him. To see what has been done in other lines will often suggest in a truly startling manner what may be done in another field. The application of the general principles of organi-

zation may have to vary in different cases to secure the maximum results, as a suit of clothes conforming to the general type may have to vary in size and pattern to hit the individual taste. But a tailor's apprentice who has seen one or two suits tried on will have a much better idea of how to make a satisfactory suit for his first customer than if he had been made acquainted only with the general principles of tailoring.

In introducing changes of management and new profit-making methods in any business, there are several considerations that must be taken into account if success is to be expected. In the first place, no plan, however good, can be introduced in such a way as to elicit the opposition of the personnel of a concern. The fondness which workmen, foremen and even superintendents have for old methods and time-honored ways of doing things has been found in innumerable cases to be an insuperable barrier to successful application of better and more scientific systems. The average foreman resents any innovation which seems to him to involve a criticism of his way of doing things. The most complete and effectual installation of a new system, if forced on the workers and foremen, will disintegrate, the moment it is left to take care of itself. The men cannot resist the temptation, in the stress of daily work, to abandon methods with which they are not familiar, and are certainly not in sympathy.

Sometimes it happens that a particularly forceful reorganizer who has had vast experience in installing new methods, and who is confident to the utmost in the scientific capabilities of his system, will put

through a radical change in management, in the face of all opposition. Even in such cases it often takes years of work to put the new plans through. The ordinary manufacturer cannot enter into such elaborate plans; and even if he could, it is doubtful if the most thorough and effective system in the world will attain to the degree of success which it should reach if it is not supported throughout by the working and managing force.

The human element must be considered, then. In this connection it is worth while to note that many a plan has gone awry because of iron-bound "labor principles" on the part of the workmen. Many workmen are restricted, both in the amount of their output and in their methods of doing things, by the rules of their labor unions, or by instructions from labor leaders. Many a manufacturer has to consider whether he can put plans through for increasing the efficiency of his working force, in view of possible opposition from this source. Some employers have even been obliged to go to the length of building two separate plants, in one of which union workmen continued old methods and lost him no more money than he could help; while in the other, non-union employes made high wages, worked according to the latest and most approved methods, and returned the larger share of the profits of the business. A discussion of this phase of the subject will have to be postponed until we shall take up methods of remuneration in relation to labor unions. Difficulties of this nature need not be feared in connection with effective reorganization of the managing force.

The first of the specific faults that we found in

the details of the average business, had to do with the duties and qualifications of the superintendent and foremen. It was pointed out that these officers could not possibly oversee all the details of their department, and the result was a marked difference in the efficiency of various divisions of the business. It is obvious that any remedy must combine the skill, foresight, and ability of the superintendent with the knowledge of details and personal experiences of the foremen in such a manner as to enlist the hearty coöperation of all. There must be some way by which the superintendent and the foremen can get together on important subjects, and can be made to feel that new plans are being put forward, not against their wishes but with their coöperation and at their suggestion. In this way, even inefficient foremen may be shown, in such a manner as to make it seem self-teaching, what the best methods and the best processes are; how the men and the machines may be managed so as to bring the greatest output, and all the advantages which come from giving each one the combined valuable experiences of all.

This plan enlists the support of the men forming the management by giving them some part in devising the best system for changes in the establishment. If their advice is consulted frequently and thoroughly concerning the difficulties that are bound to arise, if they are encouraged to suggest ways of overcoming them, if they are tactfully made to feel that the new and better methods are essentially their own, then the head of affairs may feel assured of a rapid and enthusiastic progress toward better conditions and larger profits.

It is fairly clear from the foregoing that the results desired must be accomplished through an advisory board, or council, in which the superintendent or proprietor, as the case may be, and the heads of departments, come together for consultation. Perhaps the most completely developed system for this purpose is that devised and used by Mr. C. U. Carpenter, described in a series of articles that appeared in *The Engineering Magazine* in 1907 and in his book on "Profit Making Management," of which mention has already been made. The size and composition of the advisory board will vary with the size of the establishment and the nature of the business. Ordinarily the chief executive will gather about him one man to represent each of the various interests of the factory—let us say, the chief designer, the head of the cost department, perhaps the head of the sales department, and two or three of the brightest and best informed foremen. This board should come together at stated times, and frequently—as often as twice a week. Nothing should be allowed to interfere either with the meetings, or with a strict adherence to the work planned and to accountability for the results to be achieved. Moreover, at each meeting there must be a definite outline of what there is to be accomplished and put into operation.

Let us consider for a moment what matters ought to come before such a board for deliberation and action.

1. **Economies of Production.** This subject should come first to the attention of the advisory board. The problem here is a rather complicated one, because so many factors are involved. In the

first place, as we have seen, most foremen are ignorant of the methods that are employed in the best establishments to get the greatest results from a scientific investigation into the most economical operation of machines, as well as of the systems of handling men so as to bring them up to the point of maximum efficiency. Training of foremen, then, is one step. Again, knowledge of the conditions in each department is essential to efficient handling of the problems of economical production; and this can be gained only by reports from the foremen.

The best plan, perhaps, is for the superintendent to bring up the question, giving illustrations of what has been accomplished in other plants and in cases with which he is familiar. This will bring on a general discussion which will throw a white light on conditions in each department and the objections which the members of the managing force have to new methods and processes. Personal disapproval of new plans can be cleared away, and the experience of all members can be brought to bear on obstacles to improvement. In the end, definite plans can be decided on that meet with general approval.

Among the economies to be considered, a most important one relates to the standardization of tools, equipment, and product. Something has already been said about the economies that may be effected when products can be turned out in large numbers, of a single size and pattern; but too much emphasis cannot be laid on the fact that manufacturers are very slow to see the possibilities of saving that may be brought about if a thorough-going attempt is made to standardize products. Year after year,

manufacturers and designers turn out special tools and parts made on specifications which are not uniform simply because no attempt has been made to standardize them. It is for this and other reasons that the chief designer or the manager of the tool room ought to be on the advisory board.

2. Reports on Work Achieved. No improvements in method or economies in management can be expected to yield results unless there is an effective system of checking up on the progress that has been made and of holding the foremen responsible. Progress made upon new ideas that have been decided upon should be brought before the eye of the chief executive in concrete and definite form. The economies that have been assigned to foremen to put into effect will be buried and lost sight of if the responsibility for progress upon new plans is not definitely placed and acted upon.

3. Reports should be made covering the daily routine work of the different departments. Each foreman should evidence the extent to which he is coöperating with the stock-tracing and order departments by showing what goods had been turned over to him, when the work was finished and when it ought to have been finished, with reasons for delays or failure. Reports of this kind brought before the whole advisory board will key the foremen up to making the greatest possible efforts to present a clean sheet. It is easy enough for a foreman or designer to explain to a single superintendent who is not very well acquainted with details or conditions how it happens that he has not done what was required of him, but it is a different matter to explain

the same thing to a body of men who will "take him up sharp" if he misrepresents facts or tries in any way to conceal his own inefficiency.

4. Other matters that may come before the advisory board concern the personnel of workmen, job-bosses, and so on. Difficulties that have been met with in handling men may be brought up for discussion and the experience of the whole board will often be found invaluable in solving knotty problems, especially plans that have to do with increasing the efficiency of workmen by changes in their system of pay or their methods of doing work—these will present many a serious difficulty which will require all the skill, tact, and experience in the board to solve. Then, again, it is as important to reward the efficient workmen as to consider plans of dealing with the recalcitrants and sluggards.

In any shop or business organization, the question of securing the proper amount of supervision over the workman, so that each man's work is under the eye of a superior, is worthy of most weighty consideration. The usual plan of relieving the foreman from the duty of keeping his eye constantly on all the small details of the workmen's operations is to appoint the more experienced of the working force "job-bosses." These men have some slight degree of authority; they do their share of the work like the rest, but receive a slight increase of pay because of their larger duties and responsibility.

It now becomes apparent that a report before the advisory board on the work of the efficient men is important. The accurate placing of rewards for good work, and punishment for misbehavior, will

work wonders. Foremen, as a rule, give little attention to the appointment of job-bosses and assistants, thinking it a matter of minor importance. The position, so coveted by the workmen, is often given to some personal friend, without much regard to the matter of his ability. The workmen, seeing that there is no relation between good work and promotion, lose the spur that might otherwise drive them to better efforts. Merit and intelligence and hard work go for nothing. To the management itself the appointment of the minor officials may be a matter of vital importance. The job-bosses are candidates for higher positions—sub-foremen, foremen, heads of departments. The success or failure of a whole concern may depend on whether the foremen are able, intelligent, skillful.

If rewards for the most efficient are brought up before the advisory board, and each foreman or head of department feels it incumbent on him to present tangible reasons for promotion, the personnel of the minor officials will be toned up wonderfully. The records that a well-organized concern will keep of the individual work of the men will show at once who are the drones and who are the workers. A foreman will hesitate to urge the appointment of an inferior man in a board that knows or can easily find out who are the better men. The presence of stronger men in important lower positions will show at once an increase in efficiency or organization. The management will be assured in addition of strong candidates for the higher and more important positions. More than all, the bracing effect of daily records of individual work and of appointments

based on recorded merit will be felt all through the ranks. The slothful are spurred to avoid censure or loss of position, the intelligent are given something to strive for. Extra effort brings reward; the worker is given a chance. Attention to such small details as this, if nothing else at all was done to improve conditions, would make in hundreds of cases all the difference between comfortable profits and the impending receivership.

Stress should be laid on the importance of keeping accurate records of these meetings. A good plan is to card-catalogue the various points of interest decided upon, and to take up at each meeting the cards for work projected at previous meetings. Work successfully carried through can be cancelled on the cards. Work unfinished can be charged up to the proper member of the board for completion.

It is extremely difficult to describe a system which will meet all conditions. Many variations on the foregoing plan will need to be worked out by the manufacturer to suit the circumstances of each particular shop or department. Take, for example, the broadest feature of variation in different establishments—the matter of size. The plan just described might be well suited to a small business having only three or four departments, where the advisory board could suitably consist of all the foremen, the head executive, the man who had charge of the cost accounting, and the chief designer without making the council unwieldy as to size. Many concerns, however, are large enough to have a number of superintendents or assistant superintendents, with a large number of foremen under them. Most companies

manufacture several different kinds of articles, or at least have several different departments in which various parts of the product are turned out. It would be manifestly absurd to have all the foremen in a plant of this kind members of the general advisory board. Even if there were no difficulties from the mere matter of numbers little would be gained by bringing together a large number of foremen who were in charge of departments manufacturing products or parts of products widely different in their nature. In the large packing-houses the problems facing the foremen of the slaughtering division would have little in common with those presented to the managers of the canning branch. The advisory board plan, admirable in itself, will have to be adaptable to existing conditions if it is to meet with its proper measure of success.

In a large plant the advisory council system can be made effective by building it up along the lines of the organization itself—that is, by making it military in structure. A series of sub-councils should be brought into existence, one for each line of product perhaps, or one for each division that will have interests and problems essentially similar in character. In such a case, each sub-council will have at its head one of the members of the main advisory board, the selection of such heads being determined by their experience in dealing with the particular problems that will come before the sub-councils. The work of the main advisory board will be somewhat changed by this arrangement. Each sub-council will in a measure naturally restrict itself to a consideration of the problems connected with one branch of pro-

duction, while the main board will take a general view of the whole field. This will include reports on progress made in the sub-councils. On the larger plan the main board will have to delegate a part of its detail work to the sub-committees and pay more attention to the harmonious coöperation of all the various divisions of the establishment. In this connection a consideration of progress made in each division on stock and contract work and a careful adjustment of the operations of each set of workmen will become a special feature of the work of a main advisory board in a large establishment. No department should be crowded with stock waiting for completion (which means loss from tied-up capital), while the next in line is "waiting for something to turn up."

Every manufacturer knows that a maladjustment of this kind furnishes fertile ground for weed patches in his field of profits. Every head executive uses his utmost endeavor to keep all of his workmen and machines fully employed, yet in spite of his best efforts how often does he find it necessary to run one or more of his departments overtime—on overtime pay—while in others the workmen (and foremen too) are idling along trying to make their work hold out! How can it be otherwise where the heads of departments are not brought together to consider just such matters "for the good of the concern," and where these men if consulted singly are so jealous of each other and so out of touch with conditions in other departments that their advice represents a jumble of misinformation? The field can be kept clear of weeds of this character if the men best ac-

quainted with conditions in each division of the establishment are brought together in friendly council, where the problems that beset each are understood by all, and where the knowledge and experience of all can be utilized to secure an economical adjustment of the work of each division. If in addition the work of this board is facilitated by accurate reports on the movement of stock and progress in all departments on work projected, losses from this source will be wellnigh unknown.

If the main board in a military system of advisory councils finds its chief functions in securing a harmonious adjustment of the factory force, and overseeing the progress of the minor boards, the latter will have to take up much of the detail work before attributed to the higher body. The sub-council will normally consist of the foremen handling one line of product or in one general division of the works. But it may often happen that matters will come before the sub-council which have a direct bearing on the interests of the whole concern. The member of the general advisory board who is chairman of that council will know the situation in this respect. So that when problems come up that affect general costs in that division, or records of costs and statistics, it may be well to have the head of the cost accounting department before the sub-council. If it is a matter affecting improvements in designs or standardization of product, the chief designer may be called in, or the head of the tool room, as the case may be. In general, the sub-council will take up matters relating to one particular line in the same way that the main

board handles the entire factory. Subjects for consideration should include:

1. Best and most improved processes of manufacture, with possible economies and reduction in cost. Foremen should be given definite work along these lines and should make full reports as to what has been accomplished. The reports should be supported by figures and statistics wherever possible. It may be well to have two divisions of this work. One will deal with new ideas that have been introduced and report on progress actually made. Another part may consist of an investigation by means of actual experiment on new ideas to be adopted if found feasible. A large part of the gains in cost of production depend on experiments tending to show the standard times for machine operations, the best time on piece-work, the size, shape and composition of the tool that will bring the best results.

2. New designs, new parts, standardizing tools, equipment and product. Recommendations to the designing department as to improvements in these respects should form part of the sub-council's work.

The sub-council must coöperate with the main advisory board in planning an economical adjustment of work throughout the factory. The foremen should make statistical reports of the stock they have received, finished, and passed on, and what there is on hand to be put through. Not only will full reports on this subject help the main board in keeping the establishment in smooth running order, but will help the chief executive by showing whether or not each job is making progress at the rate required by its promised time of delivery.

It may be found necessary to devote special attention, in the case of a shop with obsolete or antiquated pay system, to the question of bringing up the efficiency of the working force. Whether this can be done best by greater attention to housing, comfort, and recreation of the workmen, or by changing the pay system, will depend altogether on the nature of the work and surrounding conditions. Whichever plan is adopted, however, the subject is one that requires to be handled with the greatest of care. It will require all the skill, experience, tact, and spirit of coöperation of foremen and job-bosses to handle such problems, the most delicate and difficult as well as important, of all.

In the matter of economies in handling men, the job-bosses must not be neglected. In fact, most new plans and projects and methods of manufacture will require the active coöperation of the job-bosses. Many plans of great importance will fail without their help; many of the most difficult can be put through if their hearty assistance is first secured. In other words, any economy affecting men, machines or processes ought to be discussed and mapped out with the job-bosses present. These men will feel then that they are part of the management, and seeing before them the prospect of a real foremanship as a reward for good work, will put their shoulder to the wheel "for the good of the company." In particular it is important to have the job-bosses on the management's side in matters affecting changes in systems of pay or conditions of work. They are the deciding factor in labor disputes, and if they can be shown that no changes proposed are aimed at in-

juring the interests of the workmen in any way, many a project may be put through in a manner satisfactory to all, that under other circumstances would be impossible.

In all but establishments of the very largest size it will be found that problems common to all departments can be well discussed in a general conference of the foremen. This should be held perhaps once a month, when the monthly records and reports of the company can be brought up for consideration. In such a meeting each foreman should be compelled to turn in a report on the progress of work in his division. He should show whether he or his department is causing any delays or pressure on any part of the plant, and also indicate whatever difficulty any other foreman or department is causing him. It might seem that here was an opportunity for a foreman to lay the blame for poor work or inefficiency upon somebody else. Not if the superintendent and members of the well-informed main advisory board are present. Foremen soon learn that it is unsafe to charge their own failures to anybody or anything but themselves. An honest statement of whatever difficulties have been encountered in the work of the various departments naturally leads to a discussion in which the best plan for solving the problem is evolved.

The records and reports that are handed in to the office by each department should be brought into the foremen's conference and analyzed in the presence of all. The matters brought up in the sub-council—as to economies effected, costs reduced, standardization and new designs, output statistics and move-

ment of stock, expenses—all these can be brought before the general foremen's meeting and considered. Two advantages are secured by this method. First, the foreman knows that what he is doing will be put in concrete form before all the other foremen, and before the superintendent and the big men of the company. If possible, some system of rewards should be devised for those who present the best records and make most satisfactory progress. Second, there is little temptation to twist facts in a report that is coming before a body of men such as this, where the slightest misrepresentation is liable to instant contradiction.

It is unnecessary, perhaps, to point out that records of all the meetings described should be kept, and that some system must be devised for registering responsibility for plans projected. In the sub-council the secretary who takes the notes of the meetings may get up a card catalogue on which is kept a notation of suggested improvements which may be in charge of the head of the council. For the foremen's meetings Mr. C. U. Carpenter recommends large folding blackboards on which everything entered for carrying through is sure to be brought before the man responsible at the next meeting. Each assignment of work stays on the blackboard until it is accomplished. This arouses the foremen to use their best efforts to accomplish their task so it can be "rubbed off the slate." The cards or the blackboard will be at the constant service of the management, to show at once progress made or lack of it, and notes at the same time the person responsible.

By the methods above outlined, the first of the specific faults to be found in the ordinary type of organization may be largely eradicated. Such a plan brings to superintendent and foremen the intimate knowledge of details and personal acquaintance of men and conditions essential to efficient management. It points out at once the less able foremen and the poorly run departments and puts in operation a system of training that will go far toward bringing all sections of the works up to a uniform standard of efficiency. It spurs the foremen, gang bosses and workmen to do their best, since it shows up the weaker men and provides all an opportunity to secure immediate recognition of their worth.

CHAPTER VII.

FUNCTIONAL ORGANIZATION.

In spite of all that has been done and that may yet be done to obviate the difficulties arising from the complexity of the duties that fall to superintendents and foremen, there are many who maintain that the best results cannot be secured without a radical uprooting of the whole military type of organization. A great industrial establishment whose product is of such a nature and is turned out under conditions such that the military virtues dwindle to insignificance as a factor of its success, may indeed gain much by abandoning the army organization. The best and most efficiently organized of military establishments cannot do away with the fact that a great range of experience, skill, knowledge, training, character, and ability are demanded of superintendents and foremen. Even in shops where the different departments have been brought up to a uniform level of efficiency by teaching and working up the less able of the foremen and head men, it may still be true that each foreman has more to do than he can do well, and that the possibilities of cheapness of production and high profits have not been fully realized.

A word of caution may be sounded here. The secrets of cheap production are not always the sec-

rets of success and of high profits. Not all business enterprises succeed best by producing most cheaply. Elbert Hubbard and his Roycroft Shop would go into bankruptcy if he tried to introduce all the elements of cheap production into the highly artistic books which he makes. The makers of fashionable furniture are content to abandon most of the advantages of division of labor, because the individuality secured by artistic handiwork brings prices so high as to more than compensate them for their higher cost of production.

Nor is cheap production always the most economical outside the realm of artistic handiwork. When a force of men has to be organized hastily to perform some special kind of work, we have seen that the military type will bring the quickest results. The rehabilitation of the electric light stations after the San Francisco fire was brought about more quickly by a severely military organization, in which speed was put before cheapness, and the element of time was considered to be more costly than that of outlay for labor and material. The man who has to catch the season's demands for special products cannot stop to build up all the features that would in the end secure him lower cost of production.

It must be remembered that cheap production is, on the whole, the more "roundabout" production. Greater saving of costs may very often be effected by a more elaborate system, greater attention to division of labor, larger investment of capital in plant and machinery, and careful and long-continued training of men to reach their greatest efficiency both of manual labor and management. But the question

arises here, Will the business stand it? Is cheap production the sole secret of success in my business? Remember the case of the bicycle manufacturers who made every preparation and every outlay in order to manufacture cheaply in the end. They built substantial and elaborate plants, that were declared by mechanical engineers and experts to be best adapted for the work. They divided and sub-divided the processes of making bicycles, so that every advantage of specialization of effort was secured. Foremen were training in all the elements that make for cheap production, and their duties were specialized so that the maximum results were secured in this direction. These concerns thought that they were organized for success in the highest sense of the word; and almost anyone would have said, ten years ago, that the best organizations were those with most complete and model factories, with workmen and foremen highly skilled in their special work.

We have seen, now, that the policy of leaning on cheap production alone was a poor one. The activity in bicycle manufacturing died down. Those who foresaw that the cycle craze was destined to have "a short life and a merry one," organized as best they could with the workmen and foremen at their disposal, but entered charily into large investments or elaborate plans for cheap production. The concern that had at its head a good student of human nature, an expert on the stability of fads and fancies, was really the most effectively organized. The cheaper, the more "roundabout" process here cost more than it brought in. The most important factor deter-

mining success was not cheap production, but the time during which the business was to last.

We cannot too clearly realize that in matters of business there are always many factors to be considered; in any undertaking there are always many features that will influence the result, and the business man cannot go ahead blindly in any direction that happens to interest him. All the factors must be kept in view; all of them must be developed in harmony. All elements that make for success, even all elements that are indispensable, are not necessarily of equal importance. Improvements along certain lines must be proportioned to their influence; and where the further development of one factor begins to interfere with the usefulness of a factor of greater importance, that development has reached its limit of usefulness. In the bicycle case, all the makers of bicycles were interested in cheap production. It was an important factor, and one that could not be disregarded. But they who were wise did not develop it beyond the point where it interfered with quick production for a temporary market, or where it led to investment greater than the total strength of the demand for bicycles would justify.

With all these precautionary considerations, it still remains true that cheap production is probably the most general factor of success, the greatest contributor in the ordinary business to high profits. The old, well-established concerns, turning out a standard product that is little subject to seasonal changes of fashion or fancy, that meets a regular and well-known demand, and that is subject to close competition as to quality and price,—these may in-

deed give the most careful consideration to all the factors that influence their cost of production, whether immediately or in the long run. Many manufacturers should recognize the fact that immense gains may be made by a thorough and scientific rehabilitation of their military organizations, and, indeed, that this is a first and necessary step toward the more economical and more elaborate system. The first steps will have to be directed toward increasing the foremen's efficiency, which is, on the whole, the weak place in most organizations; the broader and more elaborate plan will fail unless it is supported by intelligent co-operation of the heads of departments.

Those who are most enthusiastic in praise of the "functional" type of organization claim that the duties of ordinary foremen are so varied, call for specialization in so many different lines of work, and demand such a variety of natural ability, that only men of unusual qualities to start with, men who have had years of special training, can perform the work in a satisfactory manner. This difficulty is an obvious one, and one which almost every employer will be ready to recognize. Possibly the chief advantage of the committee system described in the previous section is that it is intended to obviate just this difficulty. By putting the promotion of the workmen to higher positions strictly on the basis of merit and ability, as shown by individual records, and by bringing the matter of promotion before the attention of an advisory board, a concern may feel sure that the men chosen for the positions of job-boss and foreman will be men of high natural ability.

The knowledge, the years of special training, the variety of information in regard to different duties required in an able foreman, are also intended to be provided for by the advisory system. It cannot but be admitted, however, that any man who has a large variety of duties to perform cannot become as skilled and capable in performing them as if his work were limited to a more specialized field. This difficulty is intended to be provided for by functional management.

Let us glance for a moment at the duties required of the ordinary foreman, and consider the qualities and natural ability that he must possess in order to do his work satisfactorily. Broadly speaking, his duties may be briefly described as follows: He must map out the task that is to be performed by each workman, and must see that each piece of work goes to the right machine in its proper order, and that the workman knows not only exactly what is to be done, but how it can be done most economically. At the same time, he will be held responsible if any work is poorly done, or if the workman is allowed to idle at his task. He must keep an eye on the order of work, looking at the departments behind and ahead of him, so as to provide either more men to do the work, or more work for the men to do. The ordinary foreman must keep the workmen under discipline, and must fix the scale of wages and prices on piecework, besides supervising the timekeeping and the getting up of departmental records.

It is easy to see that only an exceptional man can ably handle this vast mass of duties. The foreman, as a rule, can attend to only a fraction of the

work for which he is responsible, and he leaves the balance, in many cases, to be done by job-bosses and workmen as they see fit. The scarcity of men who are capable of performing even inefficiently the duties that fall to their lot, usually results in adding to the mass of work that is forced on such men as can be found. For this reason, almost all shops are under-officered. The number of leading men employed is seldom sufficient to do the work economically. As a rule, plenty of men can be found who have one or two of the qualities necessary in a good foreman, but there are very few men indeed who can handle all the work. The qualities demanded for work of this kind may be summed up as follows:

1. In the first place, the foreman or gang-boss must be a good machinist. This is the first quality demanded, and often the only one upon which appointment or promotion is based; yet this can be acquired only by long years of careful training and experience, and it is possessed by comparatively few workmen.

2. The foreman must be a draftsman, or must at least be able to interpret drawings in such a way as to have a clear picture of the finished work in his mind.

3. The foreman, in planning the work ahead, must make every provision for the economical carrying on of the work. This will require that all the proper tools and appliances shall be ready to the workman's hand, so that no time need be lost in going back and forth for equipment. The work must be set correctly in the machine, and the machine must run at the right speed and power to get the best

results. The ability to do all these things well requires an understanding of the latest and most improved processes of manufacture, the standardization of machining times, experimental results on machines and men and so on. This part of the foreman's duties requires also a concentration of mind upon a multitude of petty details.

4. Proper care of the machines cannot be left to the workmen alone. Not only must the foreman see that broken parts are replaced, and that everything is kept clean and orderly, but he must see to it that nuts, bolts, screws, belts, and so on are always kept snug and fit, so as to prevent loss of time through breakage or poor running order. In many shops this work is of the highest importance, and demands the attention of a man who is neat and orderly himself; yet it calls for such close attention to small details that it can only be given to a gang-boss to do the best he can with it.

5. Inspection of the work turned out ought, even in military organizations, to be turned over to a special official. In the majority of cases it falls to the lot of the foreman. This work calls for honesty and for conservative judgment. The temptation to let a faulty piece of work go through and take the chance of its being sent back, rather than undergo the expense of doing it all over again, is very strong.

6. Only a foreman who is an energetic and rapid worker can secure steady and rapid work from the men under him. He must be ready and able to take up a piece of work and do it better and quicker than the man to whom it is assigned. This quality, which should belong to the "speed boss," is rarely com-

bined with the painstaking care, neatness and honest judgment demanded in the other duties.

7. Much of the clerical work in a department falls to the lot of the foreman. He must attend to the records as to time spent on each piece of work (in order that the office may ascertain exactly its cost), and must also keep separate the individual records of the men. Usually he has to set prices on piecework, to adjust wages, etc. These duties call for judgment, tact, and fairness; for ability of a clerical order; and in general, for many qualities which are seldom found in a man suited for active executive work.

All who have had experience agree that a man combining all the qualities that would fit him to perform the foregoing duties efficiently is extremely difficult to find. Mr. Carpenter maintains, however, that by proper selection beforehand, and by subsequent adequate training, foremen of the proper type can be made,— can be raised,—without abandoning the old style of organization. Mr. F. W. Taylor, in his epoch-making paper on Shop Management,* asserts that while a man combining three or four of the qualities desired in a foreman is easy to find, one combining all those mentioned would be manager or superintendent of a works instead of gang-boss or foreman. The truth will probably be found to lie between the two views, according to the nature of the business, the character of the work to be performed, and the relative importance of the factor of cheap production costs. Other things being equal,

* Transactions of the American Society of Mechanical Engineers, June, 1903.

—a most important provision,— it would seem that there is an a priori argument in favor of dividing up the work of management into simple operations, and giving each man a single function to perform. The argument is the one drawn from the advantages of division of labor. Give a man a single operation to perform, and he becomes much more skilled and expert in this task than if he disperses his talents over a broader field. So with the work of management. The man combining three or four of the qualities necessary in a good foreman can easily be found. If the work of management can be so sub-divided that the various parts of the work can be put into the hands of men of qualifications so easily found, a great saving in the work and cost of management will be achieved.

The most complete and thorough-going development of this idea is due to the work of Mr. Fred W. Taylor, of Philadelphia. In a paper read before the Society of Mechanical Engineers, Mr. Taylor developed three fundamental and epoch-making principles in business management, namely, scientific time-study as a basis for fixing piece work, the task system in dealing with workmen, and functional management as a basis for organization. Each of these principles is deserving of careful description and analysis. As we have now a fairly clear idea of the relative importance of the factors that influence the type of organization of a business concern, let us proceed to a description of "functional management."

Functional management, as developed by Mr. Taylor, involves a complete abandonment of the mili-

tary organization, and the introduction of several radical changes in the system of management.

In the first place, all the planning and clerical work, which is now distributed indifferently among foremen, job-bosses and workmen, is eliminated from the other functions of these men, and placed in a planning, or "laying-out" department. Removing the brain and clerical work from the shop, leaves foremen free to devote their time to active executive tasks; to securing the effective carrying out of the instructions sent to them by the planning department. The foreman who has the qualities necessary to put through definitely-received instructions, who can train workmen to do as they are told, can thus fulfill all that is required of him. As he need not have, in any special degree, judgment, clerical ability, engineering skill, or imagination, it will be far easier to find a wholly satisfactory man for the place than if all the other qualities were also required.

Next, the work of management is so sub-divided that each man will have as few functions as possible to perform; if possible, the work of each man in the management should be confined to a single definite simple task. In other words, the principle of division of labor is applied to the higher officers, the managers of a concern, as well as to the workmen. Hitherto, the orders of the commander or superintendent have been passed down directly through all the various grades of officers at the heads of the graded groups. Each group received all the orders of the superintendent through one man, usually the foreman or job-boss. The latter was responsible to the officer next above him for the satisfactory and

entire performance of whatever orders were handed down; and so on, up to the superintendent again. This responsibility has certain advantages, as we have seen. This formation secures quick obedience to orders; and as it prevents too great specializing, it can easily be diverted from one line of activity to another. It can take quick advantage of seasonal demands, or put through contracts for varieties of goods where shortness of time is essential. But it may readily be seen that an order affecting the clerical work of a foreman may be sent down from above to a man who, excellent in other respects, has no head for records and statistics. A new design may reach a man who has excellent executive ability, but who is a poor engineer, with no imagination. In cases of this kind, the work required may be done quickly, somehow; only in exceptional cases will all of it be done well. In functional structure, the order for each different kind of work is put into the hands of a different man, a man who is skilled in doing just that particular thing.

In military management, the orders sent down, of whatever kind, are put into the hands of the workman by a single man. This man is the only one with whom the workman has relations or to whom he is responsible. With the functional system, the workman comes into contact with a number of superior officers, to each of whom he is responsible only for a clearly defined part of his duties. He receives his daily orders and help directly from a half dozen or more foremen, each of whom does nothing but his own particular line.

The functional foremen, who take up the intel-

lectual and clerical parts of the military foreman's duties, will work in connection with the planning department just described. These will send out their orders and instructions, and will receive returns from the men, either in writing or by means of printed cards and automatic recording machines. The other functional bosses will be in the shop, in charge of the active part of the workmen's duties, and will help each man frequently.

The arrangement both of the men (as units or sub-groups in an army) and of the officers will be entirely changed by this structure. The new plan might not be so very different from the old, if the workmen were to be divided say, into larger groups, each with a half-dozen officers over it. That is not the idea. The group system disappears entirely. The reason for this is, that the duties that formerly fell to the military foreman were not of equal importance, and did not take equal amount of time. In distributing these duties among functional foremen, therefore, some will be able to superintend possibly fifty or sixty men, while others must limit their work to directing the operations of fifteen or twenty. The foreman who sees only that machines are in good condition, the belts tightened, and the screws in place, need see each man only once or twice a day, and then for a few minutes. Such a foreman could perhaps oversee all the men in one, two, or even more departments, depending on their size and the nature of their operations. Other functional directors would need to be with the men all the time, and to be ready to give each man a considerable portion of his time and attention. Such an one would have only a few

men in his charge; for the performance of this part of a foreman's duties a number of bosses would be required. Thus a single workman would belong to a number of groups of different size, in one of which perhaps fifty other workmen were found, in another of which only ten or a dozen formed the whole group.

As no one has had more experience in functional management than Dr. Taylor, and no one else has even attempted to describe it fully, we are obliged to fall back on his account of the system as tried out in the establishments he has reorganized.

In a shop of large size, Dr. Taylor found it profitable to employ eight functional foremen; four having duties connected with the active executive work of the shop, and four dealing with the brain work, clerical duties, and laying out of work. The active foremen, who come in actual touch with the men in the shop, are called "gang bosses," "speed bosses," "inspectors," and "repair bosses." Those who are engaged in the clerical and planning work are called "order of work clerks," "instruction card men," "time and cost clerk," and "shop disciplinarian." These eight men are intended to divide among them the duties that ordinarily fall to the lot of the foreman in a military system. The number of functional directors, and the division of work, are not intended to be absolute or dictatorial. Sometimes the functions of two or more of these men can be combined; sometimes much may be gained by having a greater number of divisions in the work of management. Conditions will vary with the size of the establishment, and the nature of the work to be done. Doctor Taylor's system has been most thor-

oughly and successfully tried out in large establishments manufacturing iron and steel products.

Beginning with the active shop foremen, the one most familiar to those acquainted with the military structure is the so-called "gang boss." The gang boss is the old job-boss, stripped of all his duties except those of seeing that each man is provided with work and full equipment for performing it and setting up the work in machines. He must have everything ready for a new piece of work as soon as the old is finished. All tools and equipment necessary for this job must be on hand so that the workman will not waste time running for new tools or sharpening their implements. The time of the ordinary workman in setting up his job can usually be very materially reduced. The gang boss should see that the workman sets up his work in the shortest possible time and should always be able and ready to "jump in," himself, and show how it should be done.

The speed boss takes up the work where the gang boss leaves off. His function is not only to see that the men work fast, but that all the conditions necessary to the quickest and most economical running of the machine are observed. This involves using the right kind of metal (as discovered by experiment on this line of work), the proper speed and driving power, the proper cutting angle, and so on. The men under the functional system will be provided with slide rules or printed instruction cards from the planning department, telling just what tools, metals, speed, drive, angle, etc. should be used with each kind of work. The speed boss will know just

how fast the machine should run, how quickly the work should be performed; he must see that all the instructions are accurately carried out, and that the work is done in the quickest time. Like the gang boss, he must be ready and willing at any time to demonstrate that the work can be done in the required time, by doing it himself. Both the functional foremen just described will have charge of only a small group of men, with whom they will be in constant contact, directing and helping them.

The qualities of honesty and fairness in judgment will be required of the "inspector." As he is responsible only for the quality of the work, the workmen and speed boss will have to finish it to suit him. Being independent of the others, he will be under no temptation to pass along poorly done work in order to show a good record for the department. He will not be praised if the work be quickly and cheaply done; he will be censured if it be not perfectly turned out.

The repair boss might also be called the "neat and orderly" boss. His work consists in seeing that all machines are in perfect order, free from rust and dirt and broken parts. He must see that belts are at the proper tension, and that all screws and rivets are tight. In addition, he must be a neat and orderly person, who will be offended by a litter on the floor or a jumbled disposition of tools or work around the machines or benches. Both the inspector and the repair boss will normally have charge of a large number of men, as a few minutes per day with each man is all that their duties call for.

The "clerical and brain" foreman in the func-

tional system will be members of the planning department; they represent the duties of the old foremen as regards clerical and brain work, and come into touch with the workmen only in so far as these duties affect the actual work of the labor force.

The "order-of-work or route clerk" has as his special task the planning out of the route each job should take from machine to machine, in order that all the workmen may be provided with something to do, with no danger of congestion from overcrowding or delays from lack of stock on which to operate. In connection with this task, he must see that all the various parts of a product will be ready for assembling and finishing at the same stated time. This is one of the most difficult problems in a large proportion of establishments, as we have seen. In the military structure it requires the most active and intelligent coöperation on the part of the heads of departments to avoid serious losses on this score. The special order-of-work clerk has, in the planning room, all the data necessary for an accurate and economical arrangement of the work for each set of machines, or for each group of men. He therefore makes out daily lists, instructing the workmen and also the gang bosses as to the order in which the work should be done, and the amount that should be finished by each group of men or machines. At the end of the day, of course, the route man has reports on the amount of work that has been turned out; he knows just where each job stands, how much is done, and how much remains to be done. On this basis he can plan ahead, and can make recommendations as to adding more men to groups that are likely to be over-

crowded, or as to finding more work for men that seem destined to a period of idleness. In most cases, the work on hand can be so intelligently routed that no losses from congestion or scarcity need be feared.

The "instruction card foremen" are in charge of the means by which the orders of the planning department are sent out to the shop. Note that under this system nothing is left to the guesswork methods either of foremen or of workmen. The brain work that ordinarily has to be done by the workman is all done for him now, and much more effectively, by the planning department. The worker no longer uses the tools and implements that he figures to be "about right," but the ones that mathematical, scientific experiments have shown to be most effective; he no longer runs his machine as he likes, but at the rate and with the depth and angle of cut that will most quickly and cheaply perform the work to be done. The instruction cards may vary with the work. If it is a well-known standard operation for which a slide rule or table of tools has been already made out, the instruction card need not do more than refer to slide rule or table. It should in all cases, however, give the name or number of the design to which the work belongs, and the cost order number to which the cost of the work must be charged. This last item, remember, is to be used both in calculating the total cost of the product when finished, and to furnish part of the record of the work of the man who handles it. The card should show also the piece-rate, and any premium to be paid in case the task is finished within a specified time; it should show clearly how much time should be used, and should

contain, below or alongside, a space for putting down the actual time of operation. A similar card of instructions, of a more general nature, should be made out for the executive gang bosses. These cards are made out by one or more men in the planning department, according to the character of the work to be performed. The instruction card foreman sends them out to the shop; and in case of difficulty in carrying out the directions he sees that the right man clears away the obstacles.

The "time and cost foreman" fills out, on the instruction card above described, all the information relative to the time which an operation should take, and the cost of the work. When the cards are returned to him, he sees that they are properly filled out, and that the entries are made in the time records for the men, and in the cost records for the work. This man also keeps the records of the individual workmen, so that not only is the amount of pay coming to them entered, but the efficiency of each man stands ready to testify for or against him.

These last-mentioned records will be of value to the "shop disciplinarian." In case of lateness or unexcused absence, insubordination, neglect of work, insolence, or failure to do their duty, this member of the planning department applies the proper remedy. He should keep a record of each man's virtues or defects, and make recommendations based thereon as to promotion or punishment or discharge. Any matter relating to increase or decrease of pay should be referred to him.

The description here given, it should be understood, represents the complete system after it has

been fully installed. No one with experience in handling workmen or foremen will imagine for a moment that no difficulties will be met with when an attempt is made to change from the military to the functional structure. Workmen are quick to resent any innovations. Ways of dealing with opposition from this source will engage our attention later. The greater difficulty with regard to the introduction of functional management comes from the men whose duties are most affected by the transition. It will be noticed that there is not the same opportunity here as in the military system to enlist the coöperation and support of the foremen by the Committee or Advisory Board System, because the foremen, as such, vanish. Their functions are largely split up and put into a planning department. They could not take kindly to such a scheme. Chief executives who have had years of experience uniformly assert that overcoming the opposition of foremen and heads of departments to innovations, and training them to new duties, has always been and still remains the toughest problem of reorganization. Foremen and superintendents are jealous of methods other than their own. They cannot see that these methods have not been successful. New plans, especially those of a sweeping character, are looked upon as an insult, and the greatest tact, energy and force of character are needed to overcome their opposition.

Those who have had success in introducing functional management lay stress on the fact that it must be done gradually, and that months and even years may elapse before the entire structure will be completely and satisfactorily erected. The first steps

should be those that least directly affect the men. In this class may come the introduction of standards in tools, equipment, and product, the standardization of machine operations by study and experiment. Next, the use of instruction cards and slide rules should be introduced, with practical illustrations of the advantages to be derived from their use. Time and cost cards will cause little difficulty, because in most works some sorts of forms have to be filled out anyway.

While these minor changes are being gradually introduced among the men, all the functional bosses who have little actual contact among the workmen may be started in their different duties. These will naturally be the men in the planning room, and the ordinary foremen and job bosses will not resent being relieved of the clerical part of their duties. The "time clerk," the "instruction card men," the "route clerk," and the "shop disciplinarian" may be introduced gradually; and the men and executive foremen will become accustomed to having the workers deal directly with these men in the special line of each.

The first of the functional foremen that will be brought into actual contact with the workmen should be the inspector. A complete system of inspection of products should precede any efforts toward increasing the rate of output; otherwise, the quality of the output will suffer. The inspector and the repair bosses are the first that will appear to the old-line foremen as real invaders of their territory. These must now be educated to take the functions of gang bosses and speed bosses. Their opposition will disappear as soon as they get into line with their

new positions. When trained and tutored in the possibilities of standard machine operations by careful, patient demonstration of actual work, their attitude of determined opposition changes to enthusiasm and support. They come to see, too, that their new position demands an amount of special information, forethought, and definitely marked responsibility which never had been possible before.

The advantages which ensue from functional foremanship have been indicated already, and the subject needs little elaboration. It is clear enough that the single point of speed of output can be much more efficiently handled when that matter is in the hands of a speed foreman who devotes his whole energies to this item. In military foremanship, speed is an incident, one of many, in a foreman's duties. With the functional structure, special and skilled provision is made to secure all that may be gained from this source.

Another advantage with functional management comes from the fact that, with all the brain work of the laborers specialized in the planning room, and with minute instructions to the men as to all the features of their tasks, comparatively difficult work can be done by men who are not especially skilled. The company can put ordinary laborers, oftentimes, at machines which formerly required trained mechanics. This may seem hard on the mechanics, but is an advantage to the laborers, who will be paid more, of course, than for common day labor. Nor need the mechanics suffer. The increase in the number of foremen required under the functional system, and the ease with which the few duties required from

each may be acquired, give the machinist an easily-seizable opportunity to rise to a foremanship. Under a properly graded pay system, the skilled mechanics who do not rise to higher positions may still earn so much more than before, that the new arrangement will give satisfaction to all.

CHAPTER VIII.

THE OFFICE AND THE DEPARTMENTS.

No account of the improvements that may be made in the organization of the industrial workers and their management—business organization, in other words—would be complete without some treatment of office methods and functions. To omit this, would be equivalent to describing the body without the head; the muscles, bones and organs without the brain that moves and controls them. The office represents the brain and the nervous system of the industrial organism. From it come the orders to the various limbs and muscles that start in motion the operations that shall lead to the desired result. To it must come all reports to be stored away and used as a basis for future action; just as in the human body, facts and experiences are stored away in the memory, and are drawn upon to guide us as to future activities. Another function of the office is to direct the activities of the different members in the most effective and harmonious manner, so that the desired result may be accomplished with the least expenditure of effort and energy.

Here, as in most subjects relating to business organization, we stand confused before the complexity and the bewildering variety presented by the field

of view. It is impossible to say just how the office end of any business should be built up, without a most intimate knowledge of all the conditions of the enterprise, all the factors that influence it, whether external or internal. The organization of the office will be greatly influenced, for example, by the type of management of the works. In functional management, the office will consist of the planning department, some of the members of which will be the functional foremen just described. In general, functional organization will have a strong tendency to enlarge the importance of the office, to specialize in a planning bureau all the brain work and clerical work.

In a military organization, the leaning toward specialization of the brain work is not so strong. The wholesale responsibility and authority of the various heads of divisions naturally tends to deposit with them considerable discretion as to ways and means of bringing about desired results. It leads to a gain in celerity of operation, at the expense of economy. If a military organization is to be brought to the top notch of efficiency by means of the advisory board system to which our attention has been directed, it will need to be supported by a strong and efficiently managed office. In general, it may be said that there is room for vast improvement in this respect in most establishments. All the gains from the use of system and method must come from the office. There are, in addition, greater possibilities than have yet been realized from the specialization of brain work in the "brain room." The records and statistics of men and methods, cost accounting, reports of sales, purchases, and so on,

should be more accurately, scientifically, and systematically used as a basis for cheapening the cost of production, reforming defects of management and operation, and building up a more efficient organization.

A general type of office that will be effective in all, or even a majority of cases, cannot be described, so wide is the variation in conditions, purposes, and forms of different businesses. It may be worth while, however, to point out what functions an office should in general perform, and to indicate in what ways these functions may be used to increase the efficiency of a business.

One matter of prime importance connected with office work is too often neglected—the securing and filing of reports. The vital part played by accurate and regular reports in any scheme of reorganization, in any program for increasing the efficiency of an establishment, cannot be over-estimated. Reports serve two tremendous purposes. They furnish material on which improvements can be started, based on defects shown in existing conditions. In the military system, they furnish grist at once for the advisory boards to grind. It is not sufficient to have a system of cost accounting, records of sales, and statistics of men and output—though these are too often neglected. The reports of progress made and difficulties met with should form the basis of immediate action by the proper person or persons. In the functional organization, such reports will be made out in the planning department by the head of the division in charge of cost accounting, sales, time and cost records, and so on, and sent to the instruction

card men, to the gang and speed bosses, to the order-of-work foreman—to such men as would be able to act on suggestions offered and change defective methods and processes.

Reports serve also the purpose of keeping departments and men up to the mark. The work of an advisory board will soon dwindle to insignificance if reports are not made frequently and fully as to reforms planned and results accomplished. The facts and statistics of progress throughout the factory must come in concise form to the chief executive's desk. When they arrive, something definite must be done. The idle, the lazy, the incompetent, the unprogressive, all must feel the weight of the hand of authority in chastisement or censure. Those who have accomplished what was expected of them must be rewarded. In fine, reports can be used as a spur both to start reforms along the proper lines and to keep men and organization from slipping back into the old ruts.

If results are desired, reports must be scientifically planned. There is a great danger from generalization, from loosely constructed figures, and from general remarks based on them. Yet it is comparatively easy to see just what lines must be taken in order to bring concise reports that will accomplish just what is desired,—namely, profit-making. The goods must be made at lower cost; when so made, they must be sold at satisfactory prices in sufficient quantity. The management, or the planning room, must know what should be accomplished in the manufacturing division and what has been done—in lowering cost of production, in the development of new designs and methods to meet competitor's products,

in increasing efficiency of foremen and laborers. The cost of each article made should be accurately shown, and upon this basis a compilation should be made showing clearly just how many sales must be made, and at what prices, in order to cover total cost and leave a profit to the company.

The factory reports, so important in checking up progress in manufacturing efficiency, should show just what has been put through each day or each week in the output of every department. The location of all the stock in the plant should be clearly indicated, together with plans and prospects relative to keeping the work moving in proper sequence and at a proper rate of speed. The losses from unfulfilled contracts and slow deliveries will be obviated by a speedy consideration of these reports in the advisory board meetings. The knowledge of exact conditions coupled with an effective organized system that will overcome impending delays and uneven distribution of work, will accomplish wonders in the reduction of costs.

The sales reports must be based, for a starting point, on the volume of business that must be secured, and at what prices, on each class of goods, in order to bring profits. The knowledge of what must be done,—of just where the firm stands in the matter of cost, selling price, and profit,—is an invaluable “first aid to the (dividend) injured.” The presentation to the sales manager of the sales that must be made, no matter how the goods are distributed, may be made a spur to move him to greater efforts to come up to the mark. It is easy enough, with proper cost accounting and with an analyzed profit and loss

statement, to consider what profit should be secured from each line of goods in each territory. From this it is an easy step, by taking into account the factory report, to compute exactly how many sales must be made, and at what prices. In this computation selling expense must be considered in the cost accounting, and an estimate made of the expense under which it is possible to run the sales department in order that gross profit may not be swallowed up by selling and advertising costs. When this has been estimated, measures must be taken to keep the selling expense down to the estimate. Effective and economical organization of the selling force will be called into play to keep the expense of this end of the business as far as possible below the point which an analysis shows to be necessary.

To this "sales estimate" report, showing what must be done, should be added the weekly report of what has been done. The one furnishes a standard to live up to; the other shows just what approximation is being made to that standard. It may be noted by the way that this idea of furnishing a standard may be almost universally applied in business organization, and is almost universally productive of results. As we shall see when we come to consider the subject of standard times for machining and time study for workmen, all operations should be gauged and checked up by what should be done. So in the sales reports a standard is necessary. A comparison of the actual sales results, with the data showing the results that must be secured, will prove invaluable.

It will be understood that these sales reports are not to be confounded with the reports necessary in

the organization of the selling department. Each salesman will have his own record to strive for, and will send in to the manager an account of the results which he has secured, with a comparison of the results which he should have secured.

The analyzed profit and loss statement should show, first of all, the labor cost of each line of product. To this will be added the cost of delivery, with hauling and freight charges summarized, and the proportion of expense that must be charged up against such extra items as repairs, inspection, moving, and so on. Next will come the selling expense, comparing the delivered sales with salaries, and the office and general expenses that can properly be charged up against each selling branch or territory. Add to this the part of the general office expenses that should be charged up to the selling end. This subject is one that properly belongs to accounting problems; hence it cannot be treated here in too great detail. It should be noted, however, that the proportional expense of each department should be carefully adjusted, and charged correctly in the total costs of production. This will provide an analysis that should show at once what are the points of profit, and where the losses come from.

The importance of cost reports upon each line of product has already been emphasized. They furnish the data upon which the other reports are based. They can be used to keep the foremen and departments up to the standard of efficiency that has been set. They furnish direct evidence as to what are the costs of production in any department. If a higher official brings into an advisory board meeting or a

general foremen's meeting a fully analyzed cost sheet upon some line of the product, and begins to inquire of the different heads of departments why their share of the costs is so large, the effect on the foremen responsible will be electrical. The responsibility for high cost and inefficiency is immediately and unerringly placed, and no foreman is anxious to be shown up before his equals and superiors as being below the average in efficiency. Discussions in committees, begun by those whose work has been shown up as unsatisfactory, will often clear the way to improvement all along the line. Cost statistics, together with the aforementioned factory reports, will enable a manufacturer to get up monthly stock inventories—in other words, he may secure a balance sheet of the company's operation every month. The value of monthly inventories cannot be overestimated. We have already noted that such a plan checks at the start any unprofitable operations—it shows what stock is piling up, which should be cut down, what lines are in demand, which are profitable, and which are unprofitable. It prevents losses on capital account for stock that has stopped somewhere in the factory, and has been forgotten. It allows the stock on hand to be nicely adjusted to the probable demand, so that there need be no losses from oversupply of one line of goods, and undersupply of another. Other advantages of such a system will occur to every wide-awake merchant and business man.

Let it be remembered always that reports serve two purposes. They spur the foremen and committeemen to see that output and production reports,

cost reports, progress and new method reports, shall represent a good record for them and their departments, when they know that such reports will be closely examined by the chief executive and minutely discussed in board meetings. Besides acting as a spur to impel the concern faster along the road to success, they act as sign-boards pointing the way.

The functions that an office should perform, and the records and statistics that should be kept, will vary so widely with the nature of the business and its form of organization, that few rules can be laid down. Perhaps if we study the functions of the planning department in a functional organization as described by Dr. Taylor, we shall come as near as may be to definite principles. It will give an idea of the divisions that need to be made in the office end of a large manufacturing concern, and will indicate the nature and value of different functions that should be performed by men in the organization who are not actually working with their hands.

1. First of all, will come some arrangement by which all orders for products taken by the company will be completely analyzed. The importance of such analysis will, of course, vary with the nature of the business; but it may safely be said that very few manufacturers realize all the benefits to be derived from it. Ordinarily such orders are sent to the drafting room and to such department heads as will be concerned, and mere general instructions are given to "go ahead." The result may be that when the order is half completed it will be found that some small but important part of it has been forgotten by the purchasing agent, and everything will then be

held up until the part can be procured. Or it may be that some machine is out of repair, or some part of the design has been neglected or fails to fit. What holes there are for profits to leak out! Not long ago, a big steel company was obliged to hold up a \$10,000 order for three weeks, because an attachment on one of the machines used in making part of the order had been overlooked, and had to be sent for at the last minute. The loss of interest on the money was insignificant as compared with the losses from suddenly holding up work that was in full swing, and the consequent derangement of the ordered routine of the different departments—to say nothing of the consequences of tardy delivery.

It is evident that a complete analysis of orders may save trouble and expense in innumerable ways. Such an analysis should include:

a. Designing and drafting required (if not standard stock on hand).

b. Machines or parts to be purchased, with full instructions to the purchasing department.

c. A list of all the parts to be made, with all instructions for making them. Each piece should be given a piece number, and a symbol showing what it belongs to. The last three items should be entered in an order or record book. Cards should be attached to each piece, similar to those illustrated, with space for recording time, labor cost, etc.

d. A complete schedule should be made out, analyzing the successive operations to be performed on each piece.

e. Routing. The exact order in which each piece is to travel through the works must be indi-

cated. Together with the analysis of operations to be performed and the time each should take, the progress of all the parts can be pretty correctly gauged beforehand, so that all will be ready for assembling at approximately the same time.

2. Next comes standard time study for machines and men.

The analysis of the successive operations, and the time required for each, will be furnished by men having this particular function in charge. There are two distinct features for this work; namely, the determination of standard time for the workmen, in order to set a fair piece rate; and the determination of standard times and appliances for machines, to discover under what conditions they will turn out the most work. Both these operations will demand our fuller attention later.

The man or men in charge of this work will be constantly experimenting, and must keep in touch with foremen or functional gang bosses who carry out the work in the shop. He must keep continually posted as to the best methods and appliances to use, and will need advice and assistance from the man in charge of "standardization" and maintenance of the plant. For the machine operations, the data gathered by experiment should be tabulated, and slide rules or printed tables should be provided, one for each machine or class of machines throughout the works. These slide rules, or tables, show the best way to run each piece on the machine, and give detailed rules as to the best speed and power, which tools and appliances to use, and what conditions of machining will give the best results on each kind of

work, together with the exact time required for each piece. The combination of time study for machines and men will form the basis for fixing a scientific piece rate or other wage system.

3. The balance clerk comes next. This functionary should keep a record of the movements of stock from one place to another throughout the works. If one department issues raw materials to another, a record of the issue by the one and the receipt by the other should be sent to the balance clerk. This rule will apply to all parts, materials, and partly finished articles in the establishment. Thus the balance clerk can see that the proper supplies of materials are kept on hand, and will know at once when the amount falls below a prescribed figure. This official should work in coöperation with the purchasing department, to keep materials supplied as they are needed. He may also be made very useful in the matter of harmonizing the work of different divisions of the establishment, because he can keep a complete running balance of the hours of work ahead for each class of machines and men, by receiving from the analysis and time-study officials lists of new work entered and from the inspectors and daily time cards a list of the work finished.

The elaboration necessary to keep up a perpetual book inventory does not appeal to many manufacturers, and the advantages to be derived from the duties of a balance clerk are usually foregone.

With accurate cost and stock data, it is possible to secure monthly inventories of stock approximately correct, without the use of a balance clerk. He is more necessary in a functional than in a military

organization, because he can keep the manager and sales department posted as to the number of days' work ahead for each division, so they can forestall a scarcity or congestion of work. The head of this department should be the order-of-work or route clerk already described. In a military structure, the main advisory board will make a special point of securing a steady flow of work throughout the plant.

4. Cost and expense exhibits come next for consideration. The nature and value of cost reports—definite reports to be used as a basis for action by the proper officials or boards—have already been indicated. The basis for these reports will be secured from the accounting department in the office. The books of the most progressive concerns are now completely closed and balanced once a month. The exact cost of each article finished during the previous month should be shown, with comparisons of the previous month's records. The expense account should also be shown as a comparative statement. The trouble with cost accounts in most of the old-fashioned concerns is, that they are mere memoranda. The cost account should be a completely balanced statement; and the entire expenses for office, administration, maintenance of plant, sales, and so on should be charged to the cost of the product.

5. The pay department follows. In connection with the cashier's or burser's office, there should be kept a record of the time and wages and piece-work data of each man. The use of time-recording machines is now so general and well understood, that no description of them will be needed; but the impor-

tance of accurate records of the arrival and departure of men from the works should be emphasized.

6. Identification of parts is a matter of importance. Most manufacturers have devised some symbol system for specifying which finished article each part belongs to, so that the assembling of parts may be made without difficulty. The mnemonic symbol system described by Captain Henry Metcalfe, in his account of the Frankfort Arsenal, is preferable to one which simply gives a number or a letter to each part. This system identifies parts for assembling, by a series of letters such as to suggest the complete whole. A complete system for identifying parts is of tremendous importance in securing reliable cost data on articles manufactured. It is very often desirable to stamp parts in such a way that if broken they may be recognized when they come back to the factory. This is especially true if changes in metals have been made and it is desirable to find out which kind of metal stands up best under actual usage.

7. Standardization is now to be considered. The duty of seeing to the adoption and maintenance of standard tools, fixtures, and appliances, as far as possible throughout the plant, will belong to different men or sets of men, according to the system of organization. Most large concerns find it advisable to maintain a test and experiment department, especially those liable to meet competition. The closest attention to standardization should be paid, whether this is in the hands of an expert mechanic or engineer, or is lodged in an experiment and test department.

8. A progress, or experiment, or test depart-

ment, is becoming of increasing importance in modern establishments. This division should work in close relation to the purchasing division. Some concerns even make their progress or test department an entirely independent bureau, which acts as a sort of umpire between the buying and manufacturing ends. Suggested changes and substitutions are sent to it for trial and determination. If approved, they are adopted into the shop on its order.

The importance of a test department may be illustrated by the modern methods of meeting competition. Suppose a company is making a rather complicated mechanical device in competition with several other concerns. One of the rivals of this company has just made a considerable cut in the selling price of its product. The old method of meeting competition was to lower the labor cost by taking a slice off wages; to cut down the cost of the raw stock by forcing Smith and Jones to take an additional five per cent off their bills. To-day, as a first step, the progress or test department sends out and buys one of the rival devices on which the price has been lowered. The machine is then put to a searching critical test, to make sure that the cost has been reduced without sacrificing the quality. If it stands the test, it is then dissected, examined, and analyzed down to the smallest of its component parts. Perhaps it is discovered that soft steel will do as well in places where hard was used before. Perhaps it is discovered that certain parts that before had to be made on special order and by hand have been standardized and are stamped out on machines in large quantities. In any case, the purchasing agent is

advised to cross certain products off his list, the designing and tool room departments are advised of the new method or process, and the shop superintendent or planning room proceed to manufacture the product on the new basis.

9. We come now to consider the maintenance of office and plant organization. Some official should have charge of keeping up the organization of the office itself. An elaborate time-table may be drawn up daily, showing just when and where each report is due, what instructions should be sent out and where, and all the routine necessary to maintain the system. The functionary in charge of this task should keep a large file index, in which a folder for each day may be kept, large enough to insert all reminders, instruction cards, and reports, without folding. The duties of this individual are to find out at each time through the day when reports are due; whether or not they have been received; and if not, to keep after the one who is behind, until he shall have done his duty. Almost all the reports going into and out of the office can be arranged to pass through this man.

In maintaining methods and the up-keep of the establishment, notices can be put into the file index—sometimes called a “tickler”—in advance, to come out at proper intervals throughout the year. Such notices as repairs, inspection, and overhauling of machines, belts, engines, boilers, and parts of the plant that are liable to wear out or give trouble, may be inserted at the proper intervals. Break-downs and delays can often be prevented by sending to the man in charge of inspection or repairs, notices, as they

“mature,” that such and such examination or overhauling needs to be done. The purchasing department can use this file index as a reminder of certain purchases that ordinarily have to be made at regular intervals throughout the year. In fact, each man in charge of a department or division of the works can remind himself of the various duties to be performed weekly or monthly by sending reminders, written on small slips of paper, to be inserted in the file and returned to him at the stated times.

The proper performance of this function will lower costs in two directions. First, it provides automatically for proper inspection and repair of machines and equipment before any delay has arisen from breakdown or wear and tear. Instruction cards for overhauling machinery may be made out in exactly the same way as for regular production operations, and the systematization of the work of the repair force in this way will often reduce both the amount of work to be done and the cost of doing it to a fraction of the former amount. When the repair foreman is aimlessly wandering around the works looking for trouble, or worse yet, is waiting for something to turn up, both he and his force will be idle half the time; the rest of the time they will be crowded with work that has piled up, while the workmen at the disabled or worn-out machines will be waiting for repairs to be made.

Second, the tickler system will relieve the chief executive or superintendent of some of the most vexatious and time-consuming of his duties. The superintendent who has to keep in mind the thousand and one small details that should be performed by

managers and foremen will have little time to devote attention as he should to his broader duties.

10. There are many smaller functions that should be or may be performed in an office. These will have to be grouped together as miscellaneous. Every office will have to keep a force of "office-boys," who run messages, copy letters, etc. Some establishments have a thoroughly organized messenger system, in which records of the boys are kept, showing which are most efficient. Individual records of all the working force are indispensable as aids in determining wages, fitness for promotion, and as a spur to individual effort.

Individual records are of great use sometimes in maintaining an employment bureau. To the selection of men who apply to fill vacancies or new positions, the most careful attention should be given. This work should be taken in charge by a competent man, who will make careful inquiries into the experience, skill, and character of applicants for positions. He should also be a close student of human nature. Lists of the men who are qualified to fill various positions in the establishment should be kept, and constantly revised. Here, too, may be kept the individual records of the men, showing for each one his good and bad points—punctuality, skill at various kinds of work, average earnings, absence without excuse, spoiled work or damage to machines or tools, violations of rules. A suggestive form is shown below.

EASTERN ELECTRIC CO.		
Department _____	Record for 1909-10	
Name _____		
Address _____		
Excused absences _____		
Unexcused absences _____		
Tardy _____	Fines _____	
Damaged tools _____	Poor work _____	
Earnings _____	Average of class _____	
Best at _____		
Discharged? _____	Left? _____	Why? _____
Quality of work: Good Fair Poor		

Sometimes the employment bureau can well be run by the shop disciplinarian (one of the foremen already described with the functional structure), if the works are not too large. The knowledge of character and human nature that must be displayed by the employer of labor will also be needed by the man who is to enforce shop rules and discipline the men. If one man is in charge of both functions, he should consult frequently with the foremen and bosses, both in his role of disciplinarian and as an employer of men.

Some establishments are frequently asked to rush through certain orders. For various reasons, also, parts that have spoiled or developed defects may have to be done over again, in this way threatening to arrive at the final stages for assembling behind the other parts. Some allowance should be made for

this in routing the work and calculating the time of going through all the various branches of production. But it frequently does happen in the best of regulated factories that accidents unforeseen hold up an important order or progress on a large contract. In such cases, money may be saved by dropping all other work in some department, and hurrying through a rush order for some part. This work, if possible, should be in the hands of one man, who will have no other duty than to take care of special and rush orders. In a small establishment, this function may be placed with the order of work or route clerk; in any case, the rush order man and the route clerk should work in close coöperation. The balance of materials clerk should also keep in touch with the rush order man.

This is not the proper place in which to discuss the relation of the office to various plans of social improvement, insurance, and so on, among the men. All will depend on the policy of the company in this respect, and will have to be discussed under a different heading. It may be noted, however, that even those who are most opposed to social betterment and other schemes, usually advocate some kind of accident or sickness insurance. In some companies the scheme of disciplining the men takes the form of imposing fines for breaking shop rules or for damage to machines or defective work. These fines will not be accepted as unbiased if the company keeps the money so collected. It must be returned to the men in some form or other. One of the best ways is to put it into an accident or sickness insurance fund, because thus it is given to those who need it most.

It will appear to many who have followed our description of the functions that should be performed by the office or the planning room in their relation to the various departments of a business, that such a type of organization must be extremely complicated. The relegation of brain and clerical work to the office has produced many new positions and functions in the office force that do not even exist in a successful establishment of the older type. It must be emphasized again that this is but an example of the application of the principle of division of labor. The work performed in the office in the most scientific organizations, with all its appearance of complication and new-fangled functions, must be performed by the workmen and foremen in the shop, under the old systems of management, with all the appearance of simplicity. In the new type, the work is done by a small body of specially trained men, who get the best and quickest results in the shortest time; in the old system it is done by a large and scattered body of men, not working together, and very poorly trained and equipped for the work, and each of whom, while doing it, is taken away from some other job for which he is well trained.

The average workman is well fitted to run his machine and turn out the work economically, if the proper tools, speed, feed, and other conditions of operation have been clearly indicated. If, however, as is usually the case, he is left to do everything in his own way, to choose his own tools, to begin and end where he feels like doing so, to use the speed and power that first occurs to him, and to select the other conditions of the machining operations at hap-

hazard, a vast amount of time and money will be wasted. It is no uncommon sight to see a foreman, a division superintendent, and three or four workmen spend an hour around a piece of machinery, trying to figure out just how such and such a shaft or plate fits in.

There is no question that the cost of production is lowered by separating the work of planning and the brain work from the manual labor. Yet the belief is almost universal among employers that the number of clerks and of brain workers should be as small as possible in proportion to the number of those who actually work with their hands. An examination of the most modern and successful establishments shows that the trend is rather in the opposite direction. There are some kinds of business, of course, in which there is need for very few non-manual workers. The need for superintendents and clerks in a lumber camp, for example, is very small.

On the other hand, the manufacture and sale of a patent medicine may well call for a large force in the advertising and selling departments, with only a small proportion of the working force engaged in the concoction and handling of the product. But in the typical manufacturing industry, the tendency of the most successful and progressive concerns is to increase the distinctively clerical and brain-working force, and to confine the manual workers to the performance of the tasks for which they are best fitted. In the iron and steel industry, for example, investigation has revealed the fact that in the best establishments nowadays the proportion of brainworkers to manual laborers is one to about six or seven. In

the case of similar works whose management is less effective, the proportion will run higher—one brain and clerical worker to ten or eleven manual laborers. In the case of a company doing a manufacturing business with a uniform and simple product, the proportion of producers to brain and clerical workers would, of course, be larger. But no manager or employer need feel alarmed if he sees the number of his office and managing force increasing in proportion to the number of actual hand laborers, providing the clerical and brainworkers are busy all of their time, and providing they are scientifically and systematically organized to do efficient work.

CHAPTER IX.

SCIENTIFIC STANDARD TIMES FOR MACHINE WORK.

In the description which has been given of the different types of organization and the functions of different officers,—superintendents, foremen and bosses,—frequent reference has been made to the importance of training the executives and heads of departments in the most recent and scientific development of methods and processes. Among these should be counted the determination of standard times for machining operations, the minimizing of operation costs, the economizing of the time and energy of the working force, and several allied topics.

It seems that we are never to have done with this matter of standards. The economies to be derived from the application of this principle confront us at every turn, sometimes in a new form and sometimes in a variation on an old. It would seem almost unnecessary to dwell on the necessity for economy's sake of standardizing not only all the tools, implements, machines, and appliances used throughout the shop and office, but also the methods and processes of running machines, and all operations that are frequently repeated.

There are a large number of employers and work-

men who will claim that this standardization is not only unnecessary, but positively liable to increase the cost of production. Their contention is that it is better to allow each worker to use the tool and follow the method that he has become accustomed to; that it is hard to "teach an old dog new tricks;" that the workman can get ahead faster and better by following the methods and using the tools and appliances that best suit his individuality.

There would be force in this argument if there were no way of finding out exactly which tools, implements and processes will yield in ninety-nine cases out of a hundred results better, cheaper and quicker than any other combination of tools, implements and methods of production. Those who believe in allowing the worker to do as he pleases about his work would be perfectly justified in their position if all roads led to Rome with equal ease and directness. Those who have not taken the railroad through the tunnel will still be content to struggle over the mountain passes.

The manufacturer who is doubtful about the efficiency of the new methods has the option of comparing the old and the new before taking any definite or extensive steps. After having seen what can be done by experiment in his own shop, or better yet, by investigating in some of the modern and well-managed establishments where machining operations have been successfully standardized, let him allow his own workmen to do as they please and hold them responsible for equal results. The trouble is, the vast majority of foremen and managers do not even know that there is such a thing as scientific standardiza-

tion. The workmen are allowed to choose their own tools and methods, but are not held responsible for results in any sense unless indeed the quality of their work is so poor and the quantity turned out so small as to warrant censure or discharge for total inefficiency.

Complete standardization of tools is a necessary preliminary to standardizing machine times and indeed to all scientific methods of lowering costs of production and increasing output. One of the chief causes for failure to carry through new and more efficient methods is the failure to thoroughly standardize all tools and equipment. It is not generally understood that much better results can be secured even if mediocre standards be adopted, than if some of the implements are the best of their kind while others are poor. The trouble with allowing of variations in tools is that it gives plenty of opportunity for variations in quality and quantity of output. If all the workmen are exactly on the same basis, using the same tools in exactly the same way, the bounds within which excuses for poor or insufficient work may be found are correspondingly limited. It is better to have all appliances of second grade than to have them mainly first with a few second and a few third class tools thrown in. The tendency of the workmen will almost invariably be to follow the pace set by the users of the third class appliances.

It is hardly too much to say that in the simple matter of standard tools, the economies possible are hardly realized at all by the great majority of managers. It is possible to illustrate this fact by a visit to almost any machine shop in this country. In the

matter of cutting tools, hardly a shop can be found in which implements made from a dozen different qualities of steel are not used side by side, and frequently there is no means of telling one make from another. The shape of the cutting edge of the tool is usually left to the guess or fancy of the individual workman. Yet a single illustration will show how wide a variation there may be in the efficiency of two apparently similar tools. The best treated air hardening steel will cut certain kinds of metals with a given depth, cut and speed at the rate of sixty feet per minute; yet the same shaped tool made from the best carbon tool steel under the same conditions will probably not cut more than twelve feet per minute. Even with the best of workmanship there may be a variation in efficiency of five hundred per cent according as one kind of metal is used or another.

Apart from the tools, there are undreamt of possibilities in the standardizing of machines, equipment, power transmission and so on. Some of these things can best be regulated by a skilled engineer. Take the matter of power transmission. Most of the machines in our manufacturing establishments are driven by means of belts. It is a practice almost universal to allow the workman who drives the machine to care for and tighten the belts. Few manufacturers know that there may be and usually is a tremendous loss of power when belts are not adjusted to the scientifically correct tension. The most skilled machinist cannot properly regulate a belt without the use of graduated spring pulleys which will register the tension. Experiments extended over a period of years have demonstrated that belts

properly tightened and cared for by a skilled mechanic according to standard methods of scientific accuracy, will give on the average double the power of those that are cared for by the usual hit or miss methods.

The adoption of standard methods shows also a tremendous gain in preventing interruptions to manufacture—so frequent under the usual system as to be accepted generally as the unavoidable decree of fate. Yet think of the saving in power alone that will come from the adoption and maintenance of standard methods in a small detail like this! Nor need it be supposed that the employment of a skilled mechanic to attend to this detail involves any additional expense. The work he should do has now to be done inefficiently and wastefully by the man who is running the machine, and who has to stop work that he can do well to attend to details about which he knows nothing.

In the same way, the old line foreman frittered away his time nervously trying to do things that he was poorly equipped for, while the work for which he was fitted was neglected. The losses that manufacturers the country over are incurring from failure to standardize scientifically a thousand and one small details would foot up annually into millions of dollars.

The methods of standardizing all details connected with manufacturing processes cannot be entered into. We can only point out the principle and outline its application in a few of the most important cases. It has already been noted that the standardization of machine operations involves a number

of the most vital factors affecting costs of production. The rate of output from a machine has a most direct bearing on profits. Yet the usual method, of leaving the running of a machine to the untrained experience of a foreman, leaves in ninety-nine cases out of a hundred, a loss of from thirty to a hundred per cent in output. The average foreman does not and cannot know the best results that can be secured from machining operations, because he has not had the opportunity of making experiments of a really scientific character. Such experiments and tests will show with a high degree of accuracy just what the shop ought to be able to accomplish in the way of production; and besides, the gain in productivity will furnish a standard to which well-trained foremen can be made to conform. It is easy enough for a foreman to report that he is doing his best, that the machines and men are yielding the maximum output that is physically possible in his department, if there is no way of checking up his statements by mathematically demonstrated data. It is an entirely different thing, however, if tried and proven experiments showing what can and what ought to be done are to be presented to him for comparison with his actual record.

In attempting to describe the standardization of machine operations, however, it will be necessary to limit the field still further. There are tens of thousands of machines, performing tens of thousands of totally different operations. The task of determining the conditions of maximum output for boot and shoe machinery will present totally different elements to be analyzed from those that must be met in connection with textile machinery. In all cases, however,

the principle is the same. The conditions of maximum efficiency can only be found out by long, careful, painstaking experiment, in which each factor of production is tried out with all the variations on all the other factors. The conditions of maximum speed of output for each factor should then be carefully tabulated until all the results are in, when a comparison of the data secured will give the mathematically correct formula showing the conditions of greatest efficiency for that operation.

But while the principle is the same in all cases, the difficulties of the problem cannot be clearly understood unless an analysis is made of the application of the principle to some particular case. Perhaps the best illustration for this purpose is that of lathe machines used for cutting metals. Experiments have been going on along this line for the past twenty years; it was in this field that the principle was discovered and that the greatest results have been secured.

The experiments of Dr. Taylor, Dr. Nicholson, Mr. C. U. Carpenter and others have demonstrated that the standardization of machining operations involves the solution of the following important problems:

1. The standardization of all tools that will be required. The importance of this factor has already been emphasized.

2. The power required to cut various kinds of metals when using tools of different shapes and sizes, with different depths of cut and coarseness of chip. For most purposes the power can be regarded as a constant, as the most efficient working conditions

will not require any appreciable increase of power, if any. This factor is of chief importance in determining what amount of power will give the best results, as it would be false economy to abandon an otherwise perfect set of conditions because an increase of power is required.

3. An investigation of the laws governing the cutting effect of tools of different kinds of steel upon various metals. The introduction and use of high speed steel will include an investigation of the following variables:

a. The shape of tool that will give the greatest cutting results. Yet limitation may have to be placed upon the shape that would give the greatest cutting efficiency by the consideration of the difficulty and cost of forging and grinding.

b. The length of time a tool will last before regrinding. The cost of forging and grinding may be such as to require a different size and shape from the one that would be in itself most efficient. As an illustration of this, Dr. Nicholson's tests showed that a tool with an edge or lip angle of 60 degrees would remove soft steel very rapidly. Such an acute angle, however, is unfeasible, because of the danger of breaking. The tests did establish the principle that the cutting tool should have the sharpest angle that will not break under the strain of everyday work. For cutting softer metals the angle can be more acute, but with harder metals the angle increases. For cast iron and harder steel an angle of 68 degrees is required; on chilled iron an edge angle of 86 to 90 degrees will give the best results.

c. The provision for proper treatment of the cut-

ting tool in making it (heating, forging and hardening) and in regrinding it. In all these matters the latest methods of treating tool steel should be adopted and rigidly adhered to. In grinding emphasis should be placed on the fact that the workman should not be allowed to grind his own tools. Inasmuch as tests show that the shape to which a tool is ground will affect its cutting ability to a very considerable extent, it is clearly a ruinous policy to allow the workman to grind his tools after his own hit or miss fashion,—to say nothing of the time wasted on the part of the workman. The results will be even worse than where the workman is allowed to care for his own belt. All the tools should be ground in one place and according to standard shapes and angles. It is important that these angles once adopted should be strictly adhered to, not alone because of the greater economy of cutting, but also because the standard times for machining will be based upon these shapes. Any variation will make it impossible for the workmen to come up to the record which the experiments show should be made. If possible, all tools should be ground by automatic machines, which will secure absolute uniformity in the edge angle.

d. The quality of hardness of the metal being cut. This will chiefly affect the angle or edge of the cutting tool, but should also be considered with reference to the cost of forging and tempering the cutting tool.

e. The thickness of the shaving. This needs to be considered with reference to the rate of turning and the hardness of the metal. It may be a question whether better results will be secured by a cut of a

certain depth at a certain speed or by a cut half as deep at double the speed, or some other variation of speed and cut.

f. The speed of turning. Besides depth of cut, the question of power and gear should be considered in this connection.

g. The determination of the best working conditions, such as the effect on the cutting speed of using water or soda or other cooling agent on the tool.

4. The most difficult task of all relates to methods of collecting the data secured upon a systematic plan, and insuring their practical and regular use in actual practice. The data must not only be collected; it must be put in such a form as to enable any mechanic to discover quickly and correctly for any machine in the shop what tools, what speed and power, what thickness of chip, what conditions of operation, will in each particular case enable the work to be done in the shortest time. Together with instruction of the workmen must go instruction of the foremen, not only as to the results to be expected but as to how to secure them. Lastly, provision must be made that everyday production follows closely the standard set by the experiments and tests.

As far as the workmen are concerned, the most difficult part of the problem is solved as soon as they are disabused of the idea that they can do things in their own way. It is not difficult to draw up tables, make slide rules, and formulate instruction cards which will show what should be done and how. The difficulty is to convince them that the new plans do not conceal an attempt to make them do more work

at the same rate of pay, or at least to rob them of their individuality by imposing strict rules governing what seem to them the petty and insignificant details of their work. The problem here is a far more serious one than appears at first sight; its solution requires the greatest tact, ingenuity, and a considerable insight into the psychology of the workingman. The fact that under the new plans they will work harder, and will be required to turn out a greater number of pieces, cannot be gainsaid. It is but just, then, that those conforming to the plans should be given an extra reward.

But here comes the difficulty. Workmen have been fooled so often by promises of extra pay for extra work, that they are extremely suspicious of any plan put before them by their employers which will allow him to find out what they can do if they really exert themselves, and thus give him an excuse for insisting that the pace be kept up on the former pay basis. This phase of the problem will call for special consideration in succeeding pages. It is enough to say now that the workmen will deserve and must receive higher wages for additional efforts; that they must be made to feel that the new plans will be to their advantage as well as their employers'; and that an absolutely ironclad insurance must be given to the workmen that the additional pay promised them will be as fixed as the laws of the Medes and Persians, which change not. Correct principles as applied to the work and the pay of the labor force will bring about savings and economies even more startling than those brought about by scientific standards applied to their working operations.

Leaving for later consideration the question of securing the hearty support of the new plans on the part of the workmen, the actual means by which the workmen can adopt and maintain the conditions of most efficient production deserves some notice. It is only within recent years that those who have carried on experiments in metal lathe machine operations have developed a slide rule by means of which the entire problem can be accurately and quickly solved by any mechanic. Mr. H. L. Gantt and Mr. Carl G. L. Barth, both members of the American Society of Mechanical Engineers, Philadelphia, Pa., have been for some time engaged in the work of introducing these slide rules and the methods of machining operations based on them into machine shops throughout the country.

The slide rule should be accompanied in all cases by the instruction card, before mentioned. In the absence of the slide rule the necessary information will have to be put on the instruction card, or a table can be appended which in some cases may be made to take the place of the slide rule.

It must not be imagined that the instruction card can be made out on any fixed form to cover all cases. It can be put to wide and varied use, and should vary in size and form according to the nature and amount of the information it is intended to convey. In some cases it may consist of nothing but a line or two on a small slip of paper, especially where the operations to be performed are few and well-known, and the standardization of which has become a matter of habit to the workman. In other cases it may consist of several pages of typewritten or printed matter.

Workman's name	_____
Machine	_____ Piece _____
Cost order number	_____
Tools needed:	_____

Start	_____
Depth	_____
Angle	_____
Speed of machine	_____
Remarks	_____

Instructions from	_____
Piece rate	
Premium	
Time should take	_____
Time actually taken	_____
Cost of operation	_____
Remarks	_____

Sample of instruction card for workman, to accompany each piece of work.

Some kinds of work may require an instruction card for each new operation or set of operations; for others varnished and mounted sets of instructions

may be kept on hand and issued under a check system every time the operation has to be repeated.

An illustration extremely valuable as showing the economies that can be effected by the use of standard processes and appliances, and the methods of making out an instruction card embodying the principles involved, is described by Dr. Taylor in his paper on Shop Management. The problem before him was to draw up an instruction card for cleaning a set of boilers at regular intervals, to be sure that the work was thoroughly done, to insure that the boilers should be out of operation as short a time as possible and to lower the cost of the work by having it done on piece rate wages with all possible economies of method. He performed all the work of chipping, cleaning and overhauling the boilers, and at the same time made a careful study of the time required to carry on each of the elements of the work. The time study showed that a great part of the workman's time was wasted because of the cramped and uncomfortable position of the workman. To remedy this condition, pads were made to fasten to the elbows, knees and hips. He found that the tools used were old-fashioned and inadequate; special tools and appliances were made best fitted to carry on the various details of the work. On the instruction card was entered a list of all the tools and equipment, including the pads. Each tool was stamped with its own number for identification, and all were sent out from the tool room in a single box in order to keep them together and save time. All the details of the operation were carefully set down on the card in the order in which the various parts were to be performed and the tools to be used

for each. A separate piece-work price was set on each part of the job, and inspection provided for each section of the work as soon as it was finished. The instruction card covering the whole operation covered several typewritten pages.

Yet the trouble taken was amply justified by the results. An immense saving was effected in that the work was completed in a fraction of the time previously required, so that the boilers were out of use only for a very short period. The cost of the operation was reduced to eleven dollars, whereas before the work on payment by the day without an instruction card has been sixty-two dollars. The workman, too, was paid at a much higher rate.

The next step in solving the problem of standard times for machining is securing the support of the foremen to the new methods and instructing them in the art of securing the best and most scientific results. As has been observed already, few foremen have had opportunities for making tests of a really scientific character. The average superintendent and foreman as a rule will resent any changes that seem to imply that his methods are not perfect, or the best that can be employed under the circumstances. As far as the old style foremen can see, their systems of operation have been successful, and nothing but a spirit of bullet-headed interference in their work could impel an employer or chief executive to introduce innovations. The greatest of tact and skill will be necessary in making foremen see that the new methods are not intended as a criticism of their work, but should be regarded as an improvement which is backed by scientific experiment

and which is worthy of their hearty support and admiration.

Careful, painstaking, and personal explanation of just what it is hoped to accomplish "for the good of the company" will in many cases eliminate the suspicion and distrust of the foremen. Together with this should go a long and carefully worked out series of object lessons. After the experiments have been made and the conditions of highest efficiency determined, it is a mistake to begin introducing the new methods at once. The foremen must be taken into the test room one by one, and shown what can be accomplished by following strictly the outline of the instruction cards. Not in a spirit of criticism; not in a spirit of "I told you so;" not in a manner that would suggest any intention of interfering with the foremen's work;—not so can anything be accomplished. Rather they should be given the idea that the management has discovered some new mechanical curiosity which they will be interested to inspect.

Let them sit down at the machine and do the work required in the old way, carefully timing the operation; then have an expert trained in the new methods sit down and do the same work, and let the foremen consider in their own minds what the difference in time means to the company as a whole and to the output of their departments in particular. Explain the experiments by which such and such an angle for a cutting tool, and such and such speeds and feeds, have been discovered to be the best and most efficient. Show by tests before their eyes that a tool ground at haphazard by a workman will turn out the work at a much slower rate than the best tool scien-

employer's money was simply tremendous, yet the foreman, standing by with a smile on his face, complacently remarked: "Pretty busy lot, eh?"

They were busy, but not productive; they were industrious, but their activities were not earning adequate profits for the company, nor, as a glance at the pay-roll showed, more than meagre wages for themselves. Consider in how many ways production in this department could have been speeded up without any additional labor on the part of the men. In the first place, the supply-room could have collected supplies of glue, mica and tape and passed them out in standard lots, so that only one trip would be necessary instead of three. The lots could have been made large enough to last a whole day or at least half a day, so that only one or at most two trips a day for each man would have been necessary. As the department was then run, each man decided for himself just how much of each accessory he wanted to call for, and those that were fond of knocking off work to run about the place took care to secure only a handful of mica or a few rolls of tape at a time, so that it would not last long. Those that tried to economize their time by getting two or three things at once and in large amounts, were frowned upon by the others, as they were suspected of a desire to speed up the work and set a fast pace for the rest. And the men were perfectly right in this contention. The work was paid for at piece rates, and according to the cheerful statement of the foreman, the rate had been cut once or twice already; the men fully understood that any effort on their part to increase the rate of output would act on the foreman as a red rag does

on a bull, and down would go their pay. With such a system in vogue, both the men and the company were like two children on a see-saw; if one went up the other must go down. The only thing the workmen could do was to give an appearance of great industry, and make the foreman think they were straining every nerve to get the work out fast. And in this they succeeded, though none of the parties concerned knew at what money cost, to the men in wages and to the company in profits, this success was achieved.

There was, in the department described, no fixed place for each workman to put the accessories of his work. The coils to be insulated were, of course, set up in frames or standards; but the mica and tape were piled indiscriminately on the floor or on benches, wherever there happened to be a clear space. sometimes two piles would get mixed, and then the workmen would stop and separate them—result, time wasted. Nearly every man lost considerable time looking around for his glue-pot or his tape, for there being no fixed place for anything, articles could only be found where they had last been thrown. It was the same way with cutters, knives, and other tools.

No two of the men did the work in exactly the same way. Some laid the tape on thick, others overlapped it only narrowly. Some cut the mica strips narrow, others cut them wide. Some splashed the glue over everything, others were sparing in its use. The foreman evidently preferred to let each man pursue his own methods and made no protest unless the coils actually came back from the tests inadequately insulated. Here was a loss from two sources.

In the first place, as there was no standard time or conditions of performing the operation, a great deal of time was wasted from the hit-or-miss methods of work. Second, no account whatever was taken of the amount of materials used by each man in performing his task. The men were allowed to use as much or as little as they chose, a system resulting in great waste of supplies.

To remedy these conditions there was needed first of all a system of paying for the work that would make it of vital interest for each man to increase his output to its maximum. The standard minimum time for the operations should have been determined, and a piece rate set on that basis, with an absolute guarantee that the rate would not be cut under any circumstances. It might even have been well to set a task with a differential rate of pay—this subject will come up for fuller consideration later. The determination of standard time for the operation would have caused savings in several directions. It would have given the workmen the methods by which the operations could be put through in the shortest possible time. The setting up and taking down of the work would have been very materially facilitated and hastened by standard methods. The machining itself, if we may so call it, would have been put through not only in a shorter time but in a much better way. Positive and unmistakable instructions as to the use of the glue, the width and overlap of the mica, and the winding of the tape, would have effected a saving in supplies and at the same time secured the most effective use of materials. By this

plan the losses from improper insulation would have been practically eliminated.

Next, the time lost by the workmen in running to the supply-room for materials could have been not only cut down by the plan indicated above, but probably could have been eliminated altogether. An adequate supply-room force, acting in coöperation with the order-of-work clerk and the instruction card men, could have found out beforehand just what and how much material would be needed by each workman for the work planned for the day. These could be collected, put in convenient boxes, and taken to the workman before he was ready for them.

This plan would put into very effective operation the saving in the use of materials. The boxes should be of standard size, and made especially for convenience in holding the materials to be required. If this plan were carried out in all departments the total saving in time and materials alone would be tremendous. These boxes should contain pockets in the side in which the necessary instruction and record cards might be placed.

The use of boxes as described would prevent the indiscriminate scattering of materials on the floor and benches, with the disorder and loss of time entailed. The removal of stock from the box by the workman would be facilitated and hastened by having everything in a definite place. This advantage could be further realized by careful judgment in selecting the place where the box should stand. A low table or bench placed within easy reach of the workman's hand would immediately standardize the place where the stock should be placed and could be

made to hold the coils to be insulated, the box of supplies, and the finished stock. The truckers who brought the coils in from the winding department could be required to unload the coils onto these benches, thus making it unnecessary for the workman to leave his machine to get pieces off the trucks. The boxes on low tables would save the work and time of the operator in stooping over to pick the supplies off the floor or from inconvenient places on the bench. The fact that these boxes would always be in the same position, and that the workman would become accustomed to finding his materials always in the same spot, would add appreciably to the speed of handling.

Few manufacturers realize what costly methods are in operation in their own shops. They see their men busy, or apparently so, and if the profit and loss sheet shows sadly inadequate results, they look everywhere but in the proper place for the cause. And it often takes a most keenly analytical eye to tell whether an intelligent workman is at least four-fifths as busy as he looks or only two-fifths. The workman may not be conscious of the fact that he is wasting his time; then again he may, but it makes no difference in the final analysis. No matter how industrious the workmen may seem, in ninety-nine cases out of a hundred a careful analysis will show that time is being wasted, consciously or unconsciously.

The starting point for such an analysis will be made in most cases most profitably by considering how much of his time the workman spends actually running his machine. This is the central point.

Every moment counts for profit while the machine is running; it counts for more profit if the machine is running under the best and most efficient conditions. Conversely, every moment counts for loss if the machine is shut down, or the production operations are suspended because the workman is attending to matters outside of his special work.

The ways and means employed by workmen for wasting their time are not copyrighted, hence there will have to be a new solution of the problem in each particular case. Oftentimes the workman himself will honestly think he is doing his best, and that makes it doubly difficult for an employer, probably not any too familiar with the details of the machining operations in his own shops, to pick out the flaws in the weaving. They can often be determined only by careful and exhaustive experiment by an expert who knows just what the problem is. And to get the highest results the test method will always have to be adopted. And yet hundreds of instances are recorded of valuable steps toward improvement taken from simple observation.

Not long ago a certain manufacturer was walking through his shop. That day he had received from his accountant a statement of the profit and loss of the establishment for the year past, and the two items had balanced so evenly that there was no possibility of declaring an honest dividend for the year. He had done everything in his power during the year to conduct the business in the most progressive and economical manner. The sales had been large and the market had been held fairly well. But there had been apparently a continual absorption of working

capital into machinery and stock, deliveries had been delayed in such a way as to injure seriously the organization of his selling force, while large and unexpected costs that he could in no wise account for had put his expenses up to a no-dividend amount. This man knew little or nothing of the machining operations in his shop, believing that all such matters could safely be left to the foremen. As he walked along, everything seemed to be running efficiently and smoothly. How busy the workmen were! One and all seemed to be on the *qui vive*. Here are the tool-grinders, with a line of men, each impatiently waiting his turn. Suddenly the thought struck him that, however impatient these men might be to get their tools ground, for the time that they stood there they were producing nothing. Each man represented a machine standing idle, stock waiting to be put through the factory, tools and equipment and plant itself earning no dividends, wages paid for idle hours. The manufacturer placed himself in an obscure corner where he could watch the grinding tools, took out his watch, and made notes on a slip of paper relative to the number of men in the waiting line and the time consumed by each in waiting his turn and grinding his tools. At the end of the day a simple calculation told him that on the average every man in his establishment used up six per cent of his time grinding tools. Thereupon he introduced a change in the handling of this work. He employed a few men to give their exclusive time to the grinding of tools and arranged to have well ground tools delivered to each workman with each job. He introduced no other of the score of economies that an ex-

pert would have found possible in his shop methods, because he knew practically nothing of the nature of the problem before him, of what could be done with standard conditions of machining, with standard tools and economical handling of stock. Yet the saving of the workmen's time in grinding tools alone enabled him, six months later, to declare a dividend of seven per cent on the capital stock.

Sometimes, as the above illustration will show, the causes of high production cost may be discovered by accident. Occasionally a manufacturer or shop superintendent, though knowing nothing of the broad field of economies of production in which rich harvests of dividends may be reaped, will stumble by chance upon some item of wasted time that is causing needless expense. But chance cannot be relied on to furnish a satisfactory solution of the problem of the minimum costs of production. The causes lie hidden too far back in shop methods and processes. Only the keen and experienced eye can see that the machines are not being operated in the most economical manner. The men who are going to the supply-room or returning therefrom with stock for a new job are busy enough, but their machines are not running! The group around the tool-room window getting the clamps, tools, and appliances for their next task seem to be doing necessary work, but—their machines are shut down! The line of men at the grinding tools are doing something that must be done by somebody, but—each is grinding his tool in his own individual manner, and in the meantime stock is waiting, machines are standing idle. This workman clamping a piece in a machine has

been busily at work for fifteen minutes and the job is not yet set up ready for machining, though it could be done in five minutes with proper instructions and supervision. That machine, too, has been shut down for ten wasted minutes. Look at the machines that are rapidly turning—yet how can the management be sure that the men now operating them are using the standard speeds and feeds and getting the most out of the machines and tools? All of these conditions are factors that cut the output of the ordinary shop far below what it should be. But each unit is so small, so seemingly unimportant, and so buried under the bustling routine of a busy shop, that they are overlooked or passed over as unworthy of notice.

As a matter of fact, it is the little things that count, the hidden factors that must be most carefully analyzed. The big things, the open and easily recognized factors of large production costs, have long since been weeded out. Anybody can see that paying three-dollar workmen six dollars a day will make a hopeless dent in the dividend rate; it takes careful analysis of conditions and painstaking experiment to introduce methods that will enable the three-dollar workman to double or treble his output with profit to himself and to his employer.

While the consideration of the amount of time lost in the running of machines will furnish the most convenient starting point from which to estimate and analyze losses from wasted time, this starting point is not always present. Many establishments, even among those organized to depend primarily upon low cost of production for their profits, have very few

machines or even none at all. In all establishments of any size or importance there are producing departments where the workmen do not use machines. This is usually the case in the finishing processes of manufacture, the assembling of parts, the polishing and garnishing and packing for shipment of the finished article. It becomes necessary therefore to give some consideration to the determination of standard times for machineless work, or skilled handwork, as distinguished from work done primarily on machines.

The study of the standard time and the proper conditions for skilled handwork is naturally very difficult. When we are dealing with machinery and high-speed steel and proper cutting angles it is comparatively easy to carry on exact scientific experiments by varying the factors to any desired degree. Even the speed of the machining operations is largely determined, not by the workman, but by shifting the gears that control the driving wheel. With handwork, however, we are not dealing with things, but with men. The factors of human judgment and human dexterity bulk so large in work of this kind that the closest analysis will often fall short of yielding scientific results. Machine speed can be easily controlled within any desired limits; it is only a matter of power and gears. But a workman's speed on assembling or polishing or packing, even his greatest possible speed, will vary with his personal intelligence, dexterity, and the number of years of experience he has had. On machining work, even a green hand, if intelligent, can by following instructions soon attain the maximum speed and efficiency. On

skilled handwork, the man elected to carry on the experiments cannot attain a rate of speed equal to that of the workman who has been at the work for a number of years and whose operations are in large part automatic. The tests, therefore, will have to be made by some workman of considerable experience and more than usual skill and dexterity. Here considerable caution must be observed. If the workman knows he is being tried out, he will immediately slacken his pace, and unless he is placed beyond temptation in this respect, results so secured will be worthless. The problems connected with time-study of workmen and their operations will call for careful analysis when we come to consider systems of paying wages.

In considering the economical organization of men employed in assembling and fitting work, the principle of division of labor should be emphasized. It is of great importance to separate such operations into as small a number as possible. The difficulty of determining the standard time for work increases with the number and complexity of the operations. Where the workman is confined to one or two operations the problem is not difficult. But in assembling work, for example, the workman will often be found to have to perform from eight to a dozen operations on a particular piece. Each additional operation not only makes the determination of standard time more difficult, but gives the worker an additional opportunity to idle away his time without seeming to do so. For this very reason the waste of time on handwork deserves the closest consideration.

Let us consider what steps should be taken in

securing the maximum efficiency of a number of workers whose tasks involve considerable complexity and skill. Suppose we are considering a department in which the different parts of some complex machine, as a typewriter, a sewing-machine or an automobile are fitted together into a complete whole.

1. First should come a classification of the work. This, as explained in part, will have several objects. A classification depending upon similarity of design, shape, and hand operations necessary simplifies and shortens the work of determining standard times for all the parts. This also facilitates the task of more thoroughly specializing the work so that each man shall ultimately perform only a portion of the task that he formerly put through entirely.

2. Careful experiment and test must be made by some skilled workman. It may be possible to secure his hearty support to the plans of determining minimum time by offering him double pay or paying him an additional amount for each second clipped off the former record. If possible, a man should be secured who does not expect to take up the work after his experiments are concluded. In any case he should be made to understand that the experiments are not to be used as a club to drive wages down, but as a basis for a new system that will secure larger output for the company and a guarantee of permanently higher wages for the workmen. After all, the best way to make sure that the tester is giving his heartiest support to the undertaking is to take him out of the rank of laborers and make him a job-boss or assistant foreman, with promise of promotion to a foremanship, if his work justifies. This will have an

important bearing on the solution of the problem. The workmen are not in a position to prevent a thorough investigation made by a superior officer, but will bring the strongest kind of pressure to bear on any one of themselves who attempts such work in order to keep him to the slowest pace possible without detection.

The tester or the man chosen to carry on experiments should have his time recorded, not only on each complete job as a whole, but also on each separate operation. When the workmen are re-classified, so that the work of each one is limited to one or two operations only, these records make it easier to demonstrate that the work can be put through in the specified time. With the narrowed field of work the power of the workmen to conceal the best results possible is correspondingly restricted.

3. It is always well, in investigation work of this kind, to get records from ordinary workmen, using a stop-watch so that the time the ordinary man takes to perform each operation can be recorded as far as possible. For this purpose the ordinary man's operations should be divided up into the smallest possible sections, so that it may be seen wherein and why his record fails to come up to that of the tests. The object of this is, naturally, to form a basis on which to start a campaign of reform. The two records should be brought before the general advisory board, the superintendent, and the head of the department concerned. When compared they will show, if carefully compiled, the points of wasted time in the ordinary methods of doing things. Instruction cards can then be made out, with all the time elements and tool

conditions described as in machining operations.

It goes without saying that the factors which cause wasted time with machinists will often be found to prevail with skilled hand workmen. Running to the supply-room for stock for a new job, or to the tool-room for tools, will eat up profits as fast in one department or in one kind of work as in another.

In making tests, whether in machining or otherwise, it is of vital importance to surround the tester with the best possible conditions. In this connection, moreover, it must be borne in mind that the ordinary workmen cannot be expected to come up to the mark set for them unless the same conditions prevail for their operations. The importance of surrounding the workman with all the accessories to rapid production is seldom recognized in the average shop. Thus in the insulating department referred to above we saw how much time was wasted because of piling stock indiscriminately on floor and benches, of leaving tools everywhere in general and nowhere in particular, and other details that kept the men busy on unnecessary "fussing around."

What may be called the small details essential to rapid and efficient manufacture may be further specified. First, it is important that all the stock and parts shall come to the tester and to the workman fully inspected as to the accuracy of previous operations. The inspection should, if possible, be more severe and thorough as the work proceeds through the various processes of manufacture, for the loss from spoiling a part that is reaching its final stages is greater than if it comes before much labor-time

has been put into it. It is in the final assembling work, where all the different parts are fitted together into the completed machine, that the accuracy or inaccuracy of previous operations will make a vast difference in the amount of time and labor required. Thus, wherever possible, thorough inspection should provide for such accuracy of parts that the assembler will not find it necessary to do any grinding or filing in order to make the parts fit into each other. It is partly because such grinding and filing may sometimes be necessary and sometimes may not that the difficulty arises of determining any standard time and conditions for such work. It should be possible by means of tests, standard conditions, instruction cards and careful supervision applied to the earlier stages of the work, to secure such accuracy of sizes and shapes as to remove from the final fitting together any necessity for grinding and drilling. Where, however, absolute perfection in this work, or such degree of perfection as to answer all purposes, cannot be secured, the necessary machinery for doing such grinding, filing and drilling should be placed within convenient reach of the workman.

All the parts required for the work should be not only placed within convenient reach of the workman, but should be arranged in logical order. This is particularly important in the work of fitting several parts together, as it saves time in considering what should come next. This principle is an important one, moreover, in facilitating the rapid handling of all kinds of work. It should be applied not only to stock and parts, but also to rivets, screws and tools of every description. If everything required for

work is put within easy reach, arranged in logical order, and located in a standard place, both the temptation and the possibility of wasting time is removed from the operator.

The most effective methods of facilitating the handling of stock and parts will require careful adaptation to the nature of the work. The putting together of the parts of a watch will present entirely different problems from those of setting up a bicycle, and bicycle work will require different treatment from the assembling of an automobile. In the case of heavy parts, a thorough system of hoists should be provided. Where the parts are light, particular attention to placing them in convenient and logical order will be necessary in order to avoid waste of time in handling, because, as we have seen, handling time is so much the larger proportion of the total time where the parts are small.

Examples of the tremendous savings made through the standardizing of operations and the elimination of factors causing wasted hours could be multiplied almost indefinitely. Not long ago the head of an electrical manufacturing concern became convinced that one of his departments, where the assembling of small dynamos was carried on, could be improved by a change of foremanship. So he deposed the former head of this department and put in the place a young mechanical engineer who had been recommended to him as a "wizard." In this department were eighty men, all supposed to be skilled mechanics, whose pay averaged \$4.00 a day.

The new foreman immediately instituted a series of tests, the thoroughness and accuracy of which

employer's money was simply tremendous, yet the foreman, standing by with a smile on his face, complacently remarked: "Pretty busy lot, eh?"

They were busy, but not productive; they were industrious, but their activities were not earning adequate profits for the company, nor, as a glance at the pay-roll showed, more than meagre wages for themselves. Consider in how many ways production in this department could have been speeded up without any additional labor on the part of the men. In the first place, the supply-room could have collected supplies of glue, mica and tape and passed them out in standard lots, so that only one trip would be necessary instead of three. The lots could have been made large enough to last a whole day or at least half a day, so that only one or at most two trips a day for each man would have been necessary. As the department was then run, each man decided for himself just how much of each accessory he wanted to call for, and those that were fond of knocking off work to run about the place took care to secure only a handful of mica or a few rolls of tape at a time, so that it would not last long. Those that tried to economize their time by getting two or three things at once and in large amounts, were frowned upon by the others, as they were suspected of a desire to speed up the work and set a fast pace for the rest. And the men were perfectly right in this contention. The work was paid for at piece rates, and according to the cheerful statement of the foreman, the rate had been cut once or twice already; the men fully understood that any effort on their part to increase the rate of output would act on the foreman as a red rag does

on a bull, and down would go their pay. With such a system in vogue, both the men and the company were like two children on a see-saw; if one went up the other must go down. The only thing the workmen could do was to give an appearance of great industry, and make the foreman think they were straining every nerve to get the work out fast. And in this they succeeded, though none of the parties concerned knew at what money cost, to the men in wages and to the company in profits, this success was achieved.

There was, in the department described, no fixed place for each workman to put the accessories of his work. The coils to be insulated were, of course, set up in frames or standards; but the mica and tape were piled indiscriminately on the floor or on benches, wherever there happened to be a clear space. sometimes two piles would get mixed, and then the workmen would stop and separate them—result, time wasted. Nearly every man lost considerable time looking around for his glue-pot or his tape, for there being no fixed place for anything, articles could only be found where they had last been thrown. It was the same way with cutters, knives, and other tools.

No two of the men did the work in exactly the same way. Some laid the tape on thick, others overlapped it only narrowly. Some cut the mica strips narrow, others cut them wide. Some splashed the glue over everything, others were sparing in its use. The foreman evidently preferred to let each man pursue his own methods and made no protest unless the coils actually came back from the tests inadequately insulated. Here was a loss from two sources.

In the first place, as there was no standard time or conditions of performing the operation, a great deal of time was wasted from the hit-or-miss methods of work. Second, no account whatever was taken of the amount of materials used by each man in performing his task. The men were allowed to use as much or as little as they chose, a system resulting in great waste of supplies.

To remedy these conditions there was needed first of all a system of paying for the work that would make it of vital interest for each man to increase his output to its maximum. The standard minimum time for the operations should have been determined, and a piece rate set on that basis, with an absolute guarantee that the rate would not be cut under any circumstances. It might even have been well to set a task with a differential rate of pay—this subject will come up for fuller consideration later. The determination of standard time for the operation would have caused savings in several directions. It would have given the workmen the methods by which the operations could be put through in the shortest possible time. The setting up and taking down of the work would have been very materially facilitated and hastened by standard methods. The machining itself, if we may so call it, would have been put through not only in a shorter time but in a much better way. Positive and unmistakable instructions as to the use of the glue, the width and overlap of the mica, and the winding of the tape, would have effected a saving in supplies and at the same time secured the most effective use of materials. By this

plan the losses from improper insulation would have been practically eliminated.

Next, the time lost by the workmen in running to the supply-room for materials could have been not only cut down by the plan indicated above, but probably could have been eliminated altogether. An adequate supply-room force, acting in coöperation with the order-of-work clerk and the instruction card men, could have found out beforehand just what and how much material would be needed by each workman for the work planned for the day. These could be collected, put in convenient boxes, and taken to the workman before he was ready for them.

This plan would put into very effective operation the saving in the use of materials. The boxes should be of standard size, and made especially for convenience in holding the materials to be required. If this plan were carried out in all departments the total saving in time and materials alone would be tremendous. These boxes should contain pockets in the side in which the necessary instruction and record cards might be placed.

The use of boxes as described would prevent the indiscriminate scattering of materials on the floor and benches, with the disorder and loss of time entailed. The removal of stock from the box by the workman would be facilitated and hastened by having everything in a definite place. This advantage could be further realized by careful judgment in selecting the place where the box should stand. A low table or bench placed within easy reach of the workman's hand would immediately standardize the place where the stock should be placed and could be

made to hold the coils to be insulated, the box of supplies, and the finished stock. The truckers who brought the coils in from the winding department could be required to unload the coils onto these benches, thus making it unnecessary for the workman to leave his machine to get pieces off the trucks. The boxes on low tables would save the work and time of the operator in stooping over to pick the supplies off the floor or from inconvenient places on the bench. The fact that these boxes would always be in the same position, and that the workman would become accustomed to finding his materials always in the same spot, would add appreciably to the speed of handling.

Few manufacturers realize what costly methods are in operation in their own shops. They see their men busy, or apparently so, and if the profit and loss sheet shows sadly inadequate results, they look everywhere but in the proper place for the cause. And it often takes a most keenly analytical eye to tell whether an intelligent workman is at least four-fifths as busy as he looks or only two-fifths. The workman may not be conscious of the fact that he is wasting his time; then again he may, but it makes no difference in the final analysis. No matter how industrious the workmen may seem, in ninety-nine cases out of a hundred a careful analysis will show that time is being wasted, consciously or unconsciously.

The starting point for such an analysis will be made in most cases most profitably by considering how much of his time the workman spends actually running his machine. This is the central point.

Every moment counts for profit while the machine is running; it counts for more profit if the machine is running under the best and most efficient conditions. Conversely, every moment counts for loss if the machine is shut down, or the production operations are suspended because the workman is attending to matters outside of his special work.

The ways and means employed by workmen for wasting their time are not copyrighted, hence there will have to be a new solution of the problem in each particular case. Oftentimes the workman himself will honestly think he is doing his best, and that makes it doubly difficult for an employer, probably not any too familiar with the details of the machining operations in his own shops, to pick out the flaws in the weaving. They can often be determined only by careful and exhaustive experiment by an expert who knows just what the problem is. And to get the highest results the test method will always have to be adopted. And yet hundreds of instances are recorded of valuable steps toward improvement taken from simple observation.

Not long ago a certain manufacturer was walking through his shop. That day he had received from his accountant a statement of the profit and loss of the establishment for the year past, and the two items had balanced so evenly that there was no possibility of declaring an honest dividend for the year. He had done everything in his power during the year to conduct the business in the most progressive and economical manner. The sales had been large and the market had been held fairly well. But there had been apparently a continual absorption of working

capital into machinery and stock, deliveries had been delayed in such a way as to injure seriously the organization of his selling force, while large and unexpected costs that he could in no wise account for had put his expenses up to a no-dividend amount. This man knew little or nothing of the machining operations in his shop, believing that all such matters could safely be left to the foremen. As he walked along, everything seemed to be running efficiently and smoothly. How busy the workmen were! One and all seemed to be on the *qui vive*. Here are the tool-grinders, with a line of men, each impatiently waiting his turn. Suddenly the thought struck him that, however impatient these men might be to get their tools ground, for the time that they stood there they were producing nothing. Each man represented a machine standing idle, stock waiting to be put through the factory, tools and equipment and plant itself earning no dividends, wages paid for idle hours. The manufacturer placed himself in an obscure corner where he could watch the grinding tools, took out his watch, and made notes on a slip of paper relative to the number of men in the waiting line and the time consumed by each in waiting his turn and grinding his tools. At the end of the day a simple calculation told him that on the average every man in his establishment used up six per cent of his time grinding tools. Thereupon he introduced a change in the handling of this work. He employed a few men to give their exclusive time to the grinding of tools and arranged to have well ground tools delivered to each workman with each job. He introduced no other of the score of economies that an ex-

pert would have found possible in his shop methods, because he knew practically nothing of the nature of the problem before him, of what could be done with standard conditions of machining, with standard tools and economical handling of stock. Yet the saving of the workmen's time in grinding tools alone enabled him, six months later, to declare a dividend of seven per cent on the capital stock.

Sometimes, as the above illustration will show, the causes of high production cost may be discovered by accident. Occasionally a manufacturer or shop superintendent, though knowing nothing of the broad field of economies of production in which rich harvests of dividends may be reaped, will stumble by chance upon some item of wasted time that is causing needless expense. But chance cannot be relied on to furnish a satisfactory solution of the problem of the minimum costs of production. The causes lie hidden too far back in shop methods and processes. Only the keen and experienced eye can see that the machines are not being operated in the most economical manner. The men who are going to the supply-room or returning therefrom with stock for a new job are busy enough, but their machines are not running! The group around the tool-room window getting the clamps, tools, and appliances for their next task seem to be doing necessary work, but—their machines are shut down! The line of men at the grinding tools are doing something that must be done by somebody, but—each is grinding his tool in his own individual manner, and in the meantime stock is waiting, machines are standing idle. This workman clamping a piece in a machine has

been busily at work for fifteen minutes and the job is not yet set up ready for machining, though it could be done in five minutes with proper instructions and supervision. That machine, too, has been shut down for ten wasted minutes. Look at the machines that are rapidly turning—yet how can the management be sure that the men now operating them are using the standard speeds and feeds and getting the most out of the machines and tools? All of these conditions are factors that cut the output of the ordinary shop far below what it should be. But each unit is so small, so seemingly unimportant, and so buried under the bustling routine of a busy shop, that they are overlooked or passed over as unworthy of notice.

As a matter of fact, it is the little things that count, the hidden factors that must be most carefully analyzed. The big things, the open and easily recognized factors of large production costs, have long since been weeded out. Anybody can see that paying three-dollar workmen six dollars a day will make a hopeless dent in the dividend rate; it takes careful analysis of conditions and painstaking experiment to introduce methods that will enable the three-dollar workman to double or treble his output with profit to himself and to his employer.

While the consideration of the amount of time lost in the running of machines will furnish the most convenient starting point from which to estimate and analyze losses from wasted time, this starting point is not always present. Many establishments, even among those organized to depend primarily upon low cost of production for their profits, have very few

machines or even none at all. In all establishments of any size or importance there are producing departments where the workmen do not use machines. This is usually the case in the finishing processes of manufacture, the assembling of parts, the polishing and garnishing and packing for shipment of the finished article. It becomes necessary therefore to give some consideration to the determination of standard times for machineless work, or skilled handwork, as distinguished from work done primarily on machines.

The study of the standard time and the proper conditions for skilled handwork is naturally very difficult. When we are dealing with machinery and high-speed steel and proper cutting angles it is comparatively easy to carry on exact scientific experiments by varying the factors to any desired degree. Even the speed of the machining operations is largely determined, not by the workman, but by shifting the gears that control the driving wheel. With handwork, however, we are not dealing with things, but with men. The factors of human judgment and human dexterity bulk so large in work of this kind that the closest analysis will often fall short of yielding scientific results. Machine speed can be easily controlled within any desired limits; it is only a matter of power and gears. But a workman's speed on assembling or polishing or packing, even his greatest possible speed, will vary with his personal intelligence, dexterity, and the number of years of experience he has had. On machining work, even a green hand, if intelligent, can by following instructions soon attain the maximum speed and efficiency. On

skilled handwork, the man elected to carry on the experiments cannot attain a rate of speed equal to that of the workman who has been at the work for a number of years and whose operations are in large part automatic. The tests, therefore, will have to be made by some workman of considerable experience and more than usual skill and dexterity. Here considerable caution must be observed. If the workman knows he is being tried out, he will immediately slacken his pace, and unless he is placed beyond temptation in this respect, results so secured will be worthless. The problems connected with time-study of workmen and their operations will call for careful analysis when we come to consider systems of paying wages.

In considering the economical organization of men employed in assembling and fitting work, the principle of division of labor should be emphasized. It is of great importance to separate such operations into as small a number as possible. The difficulty of determining the standard time for work increases with the number and complexity of the operations. Where the workman is confined to one or two operations the problem is not difficult. But in assembling work, for example, the workman will often be found to have to perform from eight to a dozen operations on a particular piece. Each additional operation not only makes the determination of standard time more difficult, but gives the worker an additional opportunity to idle away his time without seeming to do so. For this very reason the waste of time on handwork deserves the closest consideration.

Let us consider what steps should be taken in

securing the maximum efficiency of a number of workers whose tasks involve considerable complexity and skill. Suppose we are considering a department in which the different parts of some complex machine, as a typewriter, a sewing-machine or an automobile are fitted together into a complete whole.

1. First should come a classification of the work. This, as explained in part, will have several objects. A classification depending upon similarity of design, shape, and hand operations necessary simplifies and shortens the work of determining standard times for all the parts. This also facilitates the task of more thoroughly specializing the work so that each man shall ultimately perform only a portion of the task that he formerly put through entirely.

2. Careful experiment and test must be made by some skilled workman. It may be possible to secure his hearty support to the plans of determining minimum time by offering him double pay or paying him an additional amount for each second clipped off the former record. If possible, a man should be secured who does not expect to take up the work after his experiments are concluded. In any case he should be made to understand that the experiments are not to be used as a club to drive wages down, but as a basis for a new system that will secure larger output for the company and a guarantee of permanently higher wages for the workmen. After all, the best way to make sure that the tester is giving his heartiest support to the undertaking is to take him out of the rank of laborers and make him a job-boss or assistant foreman, with promise of promotion to a foremanship, if his work justifies. This will have an

important bearing on the solution of the problem. The workmen are not in a position to prevent a thorough investigation made by a superior officer, but will bring the strongest kind of pressure to bear on any one of themselves who attempts such work in order to keep him to the slowest pace possible without detection.

The tester or the man chosen to carry on experiments should have his time recorded, not only on each complete job as a whole, but also on each separate operation. When the workmen are re-classified, so that the work of each one is limited to one or two operations only, these records make it easier to demonstrate that the work can be put through in the specified time. With the narrowed field of work the power of the workmen to conceal the best results possible is correspondingly restricted.

3. It is always well, in investigation work of this kind, to get records from ordinary workmen, using a stop-watch so that the time the ordinary man takes to perform each operation can be recorded as far as possible. For this purpose the ordinary man's operations should be divided up into the smallest possible sections, so that it may be seen wherein and why his record fails to come up to that of the tests. The object of this is, naturally, to form a basis on which to start a campaign of reform. The two records should be brought before the general advisory board, the superintendent, and the head of the department concerned. When compared they will show, if carefully compiled, the points of wasted time in the ordinary methods of doing things. Instruction cards can then be made out, with all the time elements and tool

conditions described as in machining operations.

It goes without saying that the factors which cause wasted time with machinists will often be found to prevail with skilled hand workmen. Running to the supply-room for stock for a new job, or to the tool-room for tools, will eat up profits as fast in one department or in one kind of work as in another.

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Examples of the tremendous savings made through the standardizing of operations and the elimination of factors causing wasted hours could be multiplied almost indefinitely. Not long ago the head of an electrical manufacturing concern became convinced that one of his departments, where the assembling of small dynamos was carried on, could be improved by a change of foremanship. So he deposed the former head of this department and put in the place a young mechanical engineer who had been recommended to him as a "wizard." In this department were eighty men, all supposed to be skilled mechanics, whose pay averaged \$4.00 a day.

The new foreman immediately instituted a series of tests, the thoroughness and accuracy of which

were, however, marred by every kind of covert opposition that the workmen could present. The results secured, imperfect as they were, showed that a reduction of fifty per cent could easily be made and still provide the men with a large enough piece rate to enable them to earn more than they had before. The new system was offered to the men, together with a guarantee that the rates offered would not be cut for a period of two years. But the new foreman's efforts were not seconded by the management, and owing to friction from this and other sources, the dynamo assemblers walked out in a body. The new foreman was in a quandary. He walked straight to the chief executive's office, pointed out bluntly that the policy of the management in not supporting him had caused the trouble, and demanded that he be allowed to remedy the situation without any interference whatever. As the chief executive was utterly at sea himself, he was forced to submit.

The new foreman, instead of taking the old men back on their terms, secured a group of eight expert dynamo assemblers from among them, forty men, and from an employment agency. These men were induced to enter the shop by a high rate of pay by the day. They were absolutely unskilled in the work, being for the most part clerks and salesmen who knew nothing of assembling a dynamo. The only requirement was that they be strong, healthy, and intelligent. Each experienced assembler was then placed in charge of a group of five of these unskilled men. The experienced men were given the instruction cards and the time standard and detailed to see that the "green" hands learned all the tricks of the

trade, followed instructions carefully, and gradually approximated the standard time set for the work. The expert assemblers were to be rewarded in proportion as they secured the desired results from the men.

The officers of the company looked with consternation and dismay upon this radical departure from all established practice, and it required all the tact and oratory of the young foreman to persuade them that he knew what he was about. They finally agreed to give him a free hand for two months, he agreeing in that time to bring the production up to the former standard at no greater cost than before, or step out.

The young foreman pushed his policy with such vigor that at the end of four weeks he found it possible to put the new men on piece work. The elimination of wasteful methods and lost time through the use of instruction cards strictly followed out enabled the green men to equal and soon far outstrip the former expert assemblers. The new piece work prices, therefore, were set at about half the old ones. These rates were offered to the men as an option to continuing on the old day-wage plan, and at the same time an iron-clad guarantee was given that the rates would not be cut for a certain period. The men were assured that the company would be glad to have them earn as high wages as they could during that period. A simple calculation showed the men that they could earn more at piece work than by the day, and the assurance of no rate-cutting decided one and all in favor of the new plan.

The management adhered to a strict and rigid system of inspection in regard to the work of this

department. As the days and weeks went on they became more and more astonished at the results. By the end of the month the force of forty was turning out dynamos as rapidly and as well finished as the eighty men had done before under the old régime. At the end of three months the average earnings of each man was exceeding \$6.00 a day and steadily rising. At the end of a year the savings in the payroll in this department alone amounted to over \$25,000.

At the last meeting of the board of directors the young foreman was made an assistant superintendent, and the chief executive's chair will in all probability be waiting for him one of these days.

In analysis of hand-work, such as has been described, it is seldom possible to secure the accurate results that may be derived from a study of machining operations. For this reason there should be an especial stimulation to the worker to do his best. Even on the best analyses a workman will become so skillful in time on a hand-work job, as to exceed by a large margin the "standard time." For this reason the workman should be given a considerable increase over his daily wage for accomplishing as much or more than the "standard," and should be encouraged in every way to earn as much as he can, without fear of cutting on the piece-rate.

In concluding this subject attention should be called to the fact that standard times and conditions for machining and other operations will sometimes be limited in their application because of lack of proper equipment and lack of means to secure it. Many a manufacturer is perfectly aware that his

tools are partly second-class and partly third, that his appliances are not such as to insure the maximum efficiency, and that his machines are not of the best design. Many a manufacturer is obliged, through lack of ready cash, to ignore any scheme that involves at the beginning a complete replacement of existing tools and equipment with the most modern types, even though it can be demonstrated that such a move would increase his output a hundred per cent. He must make good with what he has; when he is on firm ground he can consider high speed steel and better machines.

To such a man it is a comforting fact that many of the factors of standard machining and nearly all of those that eliminate wasted time can be introduced to a considerable degree of effectiveness without serious change in tools and machinery. In many a plant the simple device of stopping the practice of letting the men grind their own tools and run to the supply room for stock will effect a saving of thousands of dollars. The long-headed manager, however, will not lose sight of the ultimate goal. He will look forward to the time when all the economies possible may be introduced into his working equipment. Together with reports of tests and standard times on his existing stock should go a report showing what heavier, stiffer, and more efficient type of machines should be substituted for those in use when the proper time comes. Second, he should secure a report on every machine tool in the shop, showing its points of weakness and its limitations as to cutting speeds and feeds and depth of cut; how it can be changed for the better; a description of the kind of

work that should be done on it; a record of best times on jobs; a full statement of the best machine tool to substitute for it, and an accurate comparison of possible production by the use of better equipment.

In fact, unless data of this kind are secured systematically at the start, improvement will be hopelessly retarded; and the manufacturer will find himself burdened, as time goes on, with many a newly purchased machine tool just as weak and inefficient as the old.

CHAPTER XI.

EFFICIENCY AND WAGES; DAY WORK.

In approaching the question of the proper system of pay for the workmen, there are a number of considerations that must be borne in mind and carefully weighed before a decision is reached in any particular case. The problem is such a broad and difficult one, with branches running out in so many different directions, and embracing so many different principles that any attempt to solve it offhand is liable on the one hand to lead to the adoption of a system that will involve excessive costs to the company, and on the other to arouse the antagonism of the workmen and plunge the establishment into a series of costly labor troubles.

In the first place, no system of paying wages should be adopted that does not keep in view the laborer's side of the case. The average employer or manager finds it hard to put himself in the workman's place; he cannot understand why the workman will not listen to reason; he forgets that the workman has found out in a thousand experiences that his employer is a cleverer man than he is, that he will almost invariably take advantage of his superior intelligence, and that "reason" in ninety-nine cases out of a hundred means ultimate injustice to

the man beneath. The employer does not realize what it means to be tyrannized over by some narrow-minded foreman who holds his place, perchance, through a "pull" with some one higher up; who can make the conditions of one-third or more of his existence hard or easy at will; who can make the daily earnings, the only means of livelihood, large or small; who can apportion the work fairly or unfairly; who regards the interests of the workmen and his employers as diametrically opposed, and who ranges himself on the side of the stronger.

The workman's horizon is bounded by the narrow limits of his daily work and the unhappy experiences of himself and his fellows. To him a cut in piece rates means only that the management has cast envious eyes upon his daily pittance, and means to secure, by the power of tyranny, a larger share of what he is earning. To him, working slowly has been made to appear a virtue and working rapidly a traitorous betrayal of his own and his fellow workman's interests. He is possessed of a firm idea that the less work he does the more work there will be to go around, and regards it as a desirable accomplishment if work can be so dilatorily performed that ten men will have to be hired to do what five could easily finish. For these causes, opposition may reasonably be expected from a body of workmen whenever a new system is to be adopted, no matter what the system or what advantages it offers to the laborers. Mankind in general and workmen in particular are extremely suspicious of proposals of new things, the more so when they come from a superior power. In general it may be said that changes in

the methods of work and in the methods of pay should not be forced. They should, wherever possible, be offered as an option, to be taken or left alone as the workman pleases. Note that this method cannot be followed in the ordinary cutting of a piece-rate price on work. Sometimes it may prove advisable to put a single workman on the new system, let him prove conclusively that he can earn more on that basis, and make no attempt to persuade the other men to adopt the plan. If the system is really to the workman's benefit, in time they will come of their own accord and ask to be put on the new basis. In any event, the employer that wishes to avoid trouble must abundantly prove that he is acting "on the square."

A second consideration, closely connected with the first, concerns the danger of introducing changes too radical in their nature. The system that is theoretically ideal for plain and simple kinds of work may be totally impractical for particular kinds of work. The best method of pay will often have a close relation to the character of the business and the method of pay already in use. No preconceived plan of any character can be introduced into a business organization or system if it involves tearing down existing systems that have become part and parcel of the establishment's very existence. Even the system that will be the best for the organization in the long run may be so different from the poor one at present in use that the long leap may not be taken in safety. The delicate period of transition may be bridged by introducing small modifications here and there, each closely related to the preceding

system, each introducing some element of betterment in the worker's condition, and each inspiring that confidence in the management that will enable it to reach the ultimate goal.

Each step should be taken definitely, and once taken should be adhered to. There must be no retrogression. But each step should be taken with the idea in mind that the old methods almost invariably possess a momentum that cannot safely be overcome by building a brick wall across the track. The modern organizer who enters a shop, upsets the existing methods and puts in his own ideally perfect theories, finds that in actual practice the organization will either go to pieces entirely, or after a period of turmoil and hurly-burly will go back to the grand old system, devised by men who knew the establishment's necessities from long and trying experience. He who would succeed must combine theory with the lessons learned of experience. He must consider carefully the character of the work, the thoughts and feelings of the members of the organization, the ability of the foremen and workmen, and the methods already in use. He must gain the intelligent support of the men by adapting the new methods to the old and so progress toward the goal that means highest wages to the men, combined with greatest profit to the management.

The third, and perhaps most important, consideration of all to be kept in mind in determining the system of paying wages, explains in part how this can be possible. Few manufacturers realize how small a part of total cost of production is the money paid out for labor. A largely increased production

brought about with the same machines and equipment, with the same expense for heat, light, and upkeep, means a greatly lowered cost through the proportional decrease of the indirect cost per unit of product. This is often called the "overhead cost" or the "burden." Faster production means that the investment in plant and machinery is bringing quicker dividends; it means a quicker movement of stock and thus a reduction of investment in stock through more rapid turn over. It means quicker deliveries and saving of losses from unfulfilled contracts—and greater satisfaction to customers. Increase of production also means an increase of sales with a decrease in the cost of selling each unit of product. Most manufacturers regard excessive costs of production as an evil that can be attacked only by lowering wages or cutting piece rates. Either plan carries with it dissatisfaction on the part of the workmen and more systematic efforts on their part to "stop rate-cutting if soldiering can do it." In fact, rate-cutting of any kind, even when it seems most necessary, is almost invariably a bad policy, as it involves in a measure, a breach of contract on the part of the management. The same results, and usually far better results, in lowering cost can be secured by lowering the "overhead" costs, making a quicker turn-over of the working capital invested. This can be brought about by stimulating the workmen to larger production by a correct system of pay. Larger wages, if they bring about the proper results, are not so much to be feared as antagonism on the part of the workmen, idle machines, slow-moving stock, and an increase in the indirect cost per article.

A fourth consideration to be borne in mind in determining on a system of paying wages relates directly to the computation of labor costs of production. When all the work to be done on an article is paid for on a per diem basis there is no way of telling exactly how much it has cost in labor after it has been finished, although carefully kept records may furnish an approximation. Nor can any estimate beyond a hazy guess be hazarded as to what it will cost to finish an article before it has been manufactured. One advantage of payment for work by the piece lies in the fact that the labor cost can be exactly figured out, although the rapidity with which the processes have been carried on will produce considerable variation in the indirect or overhead charges. Any system of pay that does not attempt to make the laborer's recompense directly commensurate with his output prohibits any established labor cost on the product, as it is subject to variation in accordance with the honesty and skill of the workmen.

Keeping these four considerations in mind then, let us examine the systems of pay in common use. Our interest in the advantages and disadvantages of each will center particularly on their influence in bringing about economies of production and satisfaction to employer and employe.

The oldest and most general method of paying wages is known as day work or time wage. Under this method the laborer is simply paid so much per day, no stipulations being made ordinarily as to the precise amount of work he shall turn out. To discover the merits and demerits of this method, we

must consider what influences bear upon the workman to induce him to put forth his best efforts, and what influences tend to make him "soldier," to shirk his work, to reduce his output, in a word, to increase the costs of production.

1. There is no question that it is the natural tendency of man in all walks of life to save himself as much trouble and toil as is possible. It is a natural instinct that prompts men to "take it easy." This is a factor that has to be fought against in all kinds of work, no matter what the system of pay. Unless there is some special inducement in the way of greater rewards for greater efforts, or unless a man is particularly honest in his realization of his duty to his employer or takes an extraordinary pride in his work, the tendency to work at a slow and easy gait is overpowering. There are, of course, men of unusual energy and vitality who naturally choose a fast gait and who will work hard even when they think it contrary to their own best interest. These men are rare, and serve only by contrast to show how strong are the opposite tendencies in the vast majority of mankind. It is noticeable, too, that these tendencies are strongest in the lowest grades of labor. As we go up the scale we find workmen of larger mental calibre and with a broader outlook on life and its opportunities, who take a pride in their work and who see more clearly the distant reward which comes to him who does his best. The ordinary workman does not devote much thought or observation in respect to advantages that may accrue to him on some far-off day when promotion or the respect and confidence of his employers shall reward

him for tasks well done. It is as a rule only as a result of example or direct external stimulus that he will take a more rapid pace.

While the tendency to go slow is the result of a natural instinct and hence appears in all kinds of work, it is particularly to be noted on day work, because of the fact that the amount of work done is not checked up. There is in this case no definite limit within which the tendency to idle must restrict itself.

2. In day work, the laborer has no direct interest in any increased production which he may bring about through more intelligent or increased production. The benefits of such increase go wholly to the employer. Thus the stimulus that might induce him to overcome his natural tendency to idleness and to quicken his pace is lacking. Where, as is too often the case, the workman has been made to feel that his own and his employer's interests are directly opposed, workmen frequently take a pride in seeing how little they can do without being found out. The writer has seen a workman, after an altercation with a foreman, deliberately set a number of rivets of the wrong size in a piece of work, and when they were all in, as deliberately pound them out again. This would not have been possible if he had been properly supervised, but it illustrates the point.

3. Where a number of men are engaged on similar work side by side and paid at a uniform rate by the day, the efforts of the better men are paralyzed by the example of the laziest among them. No man likes to feel that he is making a worse bargain than somebody else. The workman has made a bar-

gain, exchanging his labor for money; if the amount of money paid to a group of workmen is the same, he apparently makes the better bargain who gives the least of toil and effort in exchange. The tendency of example will always take the line of least resistance, and when a number of men are working together the average output will more or less gradually come to conform to that of the poorest and least efficient.

4. Another influence tending to lower output comes from a careful study on the part of the workmen as to what will promote their best interests. Practically all employers determine upon some definite sum which they think each of their classes of employes should earn per day, usually without any regard for the amount of work they do. Cut off by this unfortunate practice from hope of greater reward for increased production, the workman feels that he can gain only by keeping down his output to the lowest plausible amount, and convincing his employer that this amount represents the maximum output possible. Experiences innumerable have firmly fixed in the workmen's minds the conviction that it is imperative to keep their employers ignorant of how fast work can be done. They have learned in a hard school that once an employer discovers that a man can do more work than he has done, the employer will sooner or later compel him to do it with little or no increase of pay.

5. Firmly fixed in most workmen's minds is the conviction that there is just so much work to be done, and that this amount of work will be done no matter how much has to be paid for it. Therefore, the less each man does the more work there will be

for somebody else. That this conviction has a powerful tendency to restrict output, especially in the strongly organized trades, there can be no doubt. We have no space here to enter into the arguments that refute the "Lump of Labor" theory; it is mentioned only as a factor that makes many men feel that if they were to do twice as much work as they are doing now they would take some other man's job away from him.

Many of these influences that tell against the efficiency of workmen employed on day work will be found to hold with other methods of pay, while many of them can be eliminated. Where they can be eliminated, of course, it is advisable to do so. But the day work plan, while it is the most loose and most faulty of all systems, is at the same time the most flexible. That is, it can be applied to work of every description, while the other methods are more or less restricted in their application. There are certain kinds of work in which, faulty as it is, the day work system is best.

1. In many manufacturing operations, the most scrupulous perfection of work is of paramount importance. There are operations in which one piece turned out perfectly would be of more value than fifty done fairly well; where a maladjustment to the extent of a hundredth of an inch would bring irreparable damage to the whole article. This is the case in work on fine optical instruments, watches, finely graduated scientific appliances, and the like. In work of this nature it is easily seen that it would be unwise to furnish the workman with the slightest stimulus to hurry through his work or increase his

output. Inspection so minute as to guarantee absolute perfection in most cases of this kind would be impossible. Even if it were possible, a faulty adjustment once made will often be impossible to repair.

With operations of this nature, however, it should be noted that there is little danger that the employer will suffer from an undue restriction of output. The highly paid specialists who must be employed on such delicate tasks are not under the usual incentives to soldier. Their intelligence, their broader outlook on life and its opportunities, and their pride in good workmanship will spur them on to their best efforts.

2. Another kind of work not easily susceptible to pressure for a larger output is to be found in cases where several different operations have to be performed by different men before the quality of the work can be inspected, or where several men work simultaneously on the same job. If haste is liable, as it is in most instances, to mar the perfection of the operations performed, it is essential that there be some definite individual on whom the blame rests. Otherwise A will transfer the responsibility to B and B to C, and we should need a perpetual court of inquiry to settle the disputes that would inevitably arise.

At the same time, a note of warning should be sounded as to the too ready application of this principle. An expert organizer, going through the various manufacturing divisions of a run-down concern with a view to the substitution of piece-work for day-work, came to one department where rough metal plates were smoothed and polished off in preparation for further machining. The men engaged on this job

were paid by the day, and an examination of the records showed that the output was lamentably small. The foreman of the department was asked why this work was not done by the piece. He replied that the plates passed through the hands of six different sets of men; that they had formerly been paid by the piece, but that when inspection showed faulty workmanship each laborer passed the responsibility on to someone else, so that in order to insure good quality they had been obliged to pay the men by the day. The organizer thereupon put the men back on piece-work and appointed a separate inspector over each of the six groups of workmen to examine minutely the quality at each stage of the work. The output of that department doubled in a short time. The trouble was that inspection, instead of being applied where responsibility could be definitely fixed, had come only at the end of the series of operations.

3. In some cases where very delicate and valuable machinery may be strained or injured by too much haste, it is unwise to give the workman too strong a motive to increase his production. Some manufacturers, following this principle, have even gone to the extent of actually limiting the output, setting a maximum which must not be exceeded in a day. The true solution of a problem of this kind lies in finding the standard time for machining, and setting down on an instruction card the highest speed and power that experiment has proved to be safe. Workmen who can be trusted with very delicate instruments are liable to be highly skilled and highly paid specialists, who can safely be trusted to do their best even though paid by the day.

4. The most general condition under which day work is to be preferred to any other system, and which presents the most knotty problems in devising means to prevent restriction of output, is seen where the work is of such a miscellaneous character that it is impossible to measure it. In every establishment there is work to be done that cannot be weighed, computed or counted, either because the results do not appear in units of concrete form, or because the time required to do each task may vary considerably and in an indeterminable amount each day. Here indeed is a rich field for the exercise of the idler's special function! Here there is no way of catching a man "off his job" unless he sits down to rest or stands with his hands in his pocket. Illustrations of work of this character are innumerable; in most establishments, in fact, a majority of the tasks are paid for by the day because they are supposed to come into this class. Yet in thousands of instances such work could be reduced to definite form and easily measured, so that records could be kept of the amount of work each man is doing and payment made in proportion to services performed.

On repair work for example, it is generally considered impossible to set a task or pay by the job because each article is liable to be damaged to a different extent in a different way. Yet payment by the piece on repairing has often been applied with entire success under favorable conditions. The electrical concern before mentioned receives daily a large number of coils which have burned through. The repairing of a coil defective from this cause involves

a fairly uniform amount of work and is paid for by the piece.

Clerical work is often miscellaneous in its character and the amount to be done each day almost always varies. Yet the work of making out bills, form cards and the like can often be measured and paid for on the basis of amount of labor done. The amount of work on each bill, for example, will vary considerably, but the labor of getting out any twenty bills will not differ appreciably in amount from that on any other twenty. So it often is with repair work. One pair of shoes may need new soles, another is down at the heels, another requires a patch; but one man who has repaired fifty pairs of shoes taken at random in this way will have done almost exactly the same amount of work as another who has repaired fifty others. If now we assume a repairing establishment so large that one man can be given the soles, another the heels, and another the patches, the measuring of the work becomes an even simpler matter.

Even work that is essentially mental in its character can often be measured and given out in definite amounts. The adding up of columns of figures may generally be reduced to some determinate amount of work, particularly in an establishment where the clerical work averages about the same from day to day. Entries in day books, ledgers, and so on, when there is enough of such work, can often be paid for at so much per entry.

There is absolutely no kind of work, however miscellaneous its character, that cannot be described in terms of some kind. Work of every kind, too, may be and should be inspected and accurate definite rec-

ords should be kept showing how much and what has been done. The fact that the management has on file a set of cards showing the performance of the workman for every day will prove a wonderful stimulus in preventing a man from trying to conceal the fact that his bustling around is leading to no results.

5. In rare instances it will be necessary to pay workmen by the day because they are kept involuntarily idle a part of the time. Thus a force of dock hands who are employed in removing wares from ships as they come to the dock may have to wait while one ship is going out and another coming in. The boats may arrive at irregular intervals, or take a shorter or longer time in coming to rest and putting out. This is perhaps not a good example, for it is difficult to pay goods porters by the piece unless the cargoes are uniform, but it furnishes a simple illustration. In many instances of work of this nature it has been found good policy to pay workmen by the hour while they were waiting or being employed on other than their regular occupation, and then to put them on a piece rate of some kind as soon as their regular tasks were ready for them. In the textile industries the machine operators often have to wait while a different group of workmen set the pieces in the machines, during which time they are paid by the hour in order to avoid the injustice of making them spend part of their working hours without pay through no fault of their own. In modern establishments a great deal of attention has been devoted to the problem of eliminating time wasted from this cause. Wherever the expense is not too great a few extra machines are provided so that the work of

setting up can go on on some machines simultaneously with the running of the others. A careful adjustment of this kind avoids wasted time both on the part of the regular operators and of those who set the pattern cards and shuttles. All that has been said in the previous chapter in regard to the expense of wasted time will apply in this case. It cannot be denied, however, that there are many instances where conditions of a peculiar nature have prevented any solution of the problem, and where, in justice to the workmen, payment by the day or by the hour seems unavoidable.

6. Suppose in a factory it suddenly becomes necessary to employ a number of new and untried workmen on a job with which they are unfamiliar. It would obviously be unfair to start them on piece-rates. They could not reasonably be expected to start out in the beginning at a rate of speed anywhere near that which a few weeks of experience would enable them to attain. A rate of pay by the piece that would enable them to earn fair wages at the start would have to be so high as to cost the management an excessive amount for the work. A rate on which they could earn fair or even high pay in the end would bring them for a considerable period, while they were acquiring skill at their tasks, a mere pittance. In the latter case the workmen could not be induced, in all probability, to take the work. In the former case the management, to protect itself from excessive cost of production, would be compelled to make a series of cuts in the piece rates, with all the consequences of dissatisfaction on the part of the men, suspicion of unfairness in cutting down the

workmen's pay, and temptation to soldiering in order to prevent further cuts. It is obvious that the only fair and satisfactory method of pay under these circumstances is on a day basis.

Even then the most careful measures will have to be taken to prevent soldiering, for if the workmen know that payment by the piece is ultimately to be established, they will do their utmost to prevent making a high record, so that the price, when fixed, will be a large one. The strictest supervision will not secure from the workmen, imbued as they are with the importance of going slowly, the lowest time in which a job can be done. The only remedy for this state of affairs is, in the case of machine work, a careful study of standard times for machining, and in the case of other kinds of work, the establishment of the lowest times for the job by a study of unit times, elsewhere described. It is obvious, however, that whatever may be the policy of the management in regard to securing ultimately a low labor cost of production, there is a period during which new work should be paid for by the day.

The six sections listed above give in a fairly comprehensive way the conditions under which it will be found advisable to pay for labor on a time basis. We have seen, however, that there are special incentives to idleness or "marking time" when the workmen are paid on this basis. To recapitulate briefly these incentives are: 1. The natural tendency of mankind in all walks of life to "take it easy." 2. The fact that extra efforts to increase the output accrue to the benefit of the employer, not to the employe. 3. When men are working together, he who

does the most seems to be making a bad bargain in giving more for his wages than his fellows. 3. The fear of giving the employer a definite basis for demanding permanently and from all the men a high output if he learns how fast work really can be done. 4. The conviction that he who does more than is necessary is taking some other man's work away from him, due to the prevalence of the Lump of Labor theory.

It may not be amiss to give at this point a brief description of some of the methods that may be employed, even where payment by the day is necessary, to stimulate a large output, even though in doing so it will be necessary to review some principles already touched upon and to anticipate in part other principles that will call for fuller consideration later.

1. First of all should come the matter of inspection and office records of daily performance of work. When the work is carefully inspected each day and a report of it is sent into the office, something definite is done that the most careless workman cannot get away from. The inspector should fill out a printed card every day, stating that he has looked over the work done by such a man, enumerating in detail just what has been done, whether each task was performed satisfactorily or not, and any special item deserving of comment that has come under his observation. Illustration will show a form card for inspection of day work:

JOHN SMITH AND COMPANY.		<i>Day Work Inspection.</i>		
..... Department.	Workman's Name.....			
	Good	Fair	Poor	
Sweeping floors, Room K	....	....	....	
Cleaning windows, Room K	....	....	....	
Cleaning benches, Room K	....	....	....	
Removing dust and oil from machines, Room K	....	....	....	
Removing ashes, Room L	....	....	....	
The following items unsatisfactory.....				
.....				
.....				
Remarks.....				
	Signed.....			

2. There should be some definite means of letting interest in the good or ill performance of his duties the workman know that the management takes an in such a manner as will directly affect his interests. In one establishment where the system of inspection and records were carefully kept up, red credit cards were issued every week to those workmen who had "perfect scores." Every man who could present ten credit cards in his own name was entitled to an increase of 50 cents a week in his pay envelope. The issuance of the credit cards alone effected an entire change in the mental attitude of the men toward their work. Whereas before they had been moved only by a desire to get through their tasks as easily and with as little effort as possible and to avoid setting a high record, the credit cards appealed to them as a badge or medal for good workmanship. He who did not receive one was in a measure disgraced before his fellows; he who did proudly displayed it before the others. The approach of Saturday afternoon, when the cards were distributed, was awaited with impatience. It was a sort of a lottery in which the more efficient drew prizes. All the old feeling that

he who did his best was making a poor bargain with the employer, was swallowed up in the man's pride in good workmanship; for no man cares to be definitely shown up as a poorer or more inefficient workman than the man next to him. In addition to the reward of merit, there was also the more material advantage of an increase of pay for the possession of ten of the credit cards.

In the establishment of which we are speaking each addition to the pay was accompanied by a slight increase in the duties the man was to perform, this being understood as a promotion for good workmanship and as a step toward an elevation to a more responsible and better-paid position. The men were started at ten dollars a week; when by the credit card system their earnings had reached fifteen dollars the increases were stopped, but they were candidates for promotion to another department at higher pay as fast as openings presented themselves. Naturally under such a system the workmen strained every nerve to get into the fifteen-dollar class. After they had attained this distinction, even if not promoted at once, they were extremely careful not to jeopardize their chances of advancement by any falling off in the work. Those who failed to make headway after a certain time were discharged, not because the management had any grudge against them, but because they had failed to come up to the mark. The justice and fair-mindedness of this system, and the opportunities it gave for a good man to prove his mettle and reap the reward of merit made it sought after by the best men, and the management had no

difficulty in supplying the places left vacant by those who dropped out.

Thus we see that even where payment on the basis of time is necessary it is still not impossible to give the workman an incentive to increase his output. The workman must be made to feel, first of all, that the superintendent knows just how much he is doing and how well he is doing it. Next, he must be disabused of the idea that his employers have fixed a definite sum as the maximum limit of his earnings, beyond which he cannot go no matter how well he does. There must be a tangible assurance that each man's wages will be raised as he improves and that those who fail to rise to a certain standard will be discharged. The hope of promotion should constantly be kept before the eyes of the men as a goal to strive for, and the more definite and concrete this hope can be made to appear, the better will be the results.

Thus in a certain telephone appliance factory, there is a large department where young men are paid \$8 a week to solder the wires onto the ends of the switch-board plugs and perform other tasks. The miscellaneous nature of the work makes it necessary to pay by the day, but it is the rule of the shop that when the men have acquired sufficient skill and expertness to solder a standard number of wires in fourteen minutes they shall be recommended for promotion to the next department. This fourteen minutes' time represents to them the definite hope of promotion, and one and all eagerly strive for the goal. There is a large clock in plain sight by means of which they can time themselves. It was highly

interesting to see the young fellows working away in friendly rivalry, the new-comers announcing "thirty minutes," "twenty-six minutes," and so on; while those that had been there some time were making "twenty minutes," or "eighteen minutes," as the case might be. One man announced proudly, "sixteen minutes, two off the last and two more to go." The foreman, a very intelligent man and highly respected by the workmen, told the writer that the candidate for promotion nearly always got his time down to thirteen minutes before submitting to the test that would mean his recommendation for advancement, so as to allow for nervousness or mishaps. When asked if it would not be possible to fill the shop with fourteen-minute men, he replied, "Oh, yes, but then we should have to pay them fifteen or eighteen dollars a week. These lads get only eight dollars, but the opportunity for advancement means a lot more to them than almost any amount of additional pay we might offer. Besides, with skilled workers on even high pay without any other inducement it would be almost impossible to keep them to an average of fourteen minutes, which they would regard as too high a standard. The boys here do not consider this time as unreasonable, because every two or three months they see some one of their number promoted for achieving it.

3. In applying the principles noted above for increasing the efficiency of men employed on day rates, care should be exercised in apportioning the work lest something should prevent the keeping of strictly individual records of each man's performance or the definite assignment of responsibility.

The portioning out of work of a general nature without any clear-cut delimitation of just what each man is to do is an obstacle that will prevent clean inspection of the work or the keeping of records. Moreover, there is no doubt that when time is the basis of payment the workman will accomplish more if someone assigns him a definite task, or definite duties to perform. If a man is told in a general way to keep a room clean and attend to the fire there is every temptation to soldier, and every kind of excuse for failing to do his work properly. But if he knows definitely just what tasks he is to perform, and if in addition these tasks are set down in black and white, he cannot very well get away from the entire performance of his duties. The use of instruction cards, described in previous sections, may well be extended to work of every class and character.

Of the same nature, and open to the same objections, is the assignment of even a definite and fixed amount of work to a group of men. Even if inspection is most rigid and careful records are kept, there is no satisfaction to be gained in trying to fix the responsibility on a group of men. A will say that B cleaned the windows poorly; B will say that he had to do it in a hurry because it was A's turn, and anyway both A and C had made him do a lot of work that really belonged to them. C will say that he understood A was to wipe off the machines, and A will contend that he would have done so if D had not let the fire go out and left it for him to build. There are very few operations indeed that require two or more men to coöperate with each other simultaneously and require each to do exactly the same thing

so that one man's work cannot be distinguished from another's. Such a case might be that where two men have to lift opposite ends of steel rods to load them onto trucks. In this instance it is difficult to see how the responsibility could avoid being divided. But in the vast majority of cases where men work in gangs it would be possible by a careful apportionment of the work to give each man a definite task, keep a record of his work and his efficiency, and hold him definitely responsible for the proper performance of his share.

4. Another method of increasing the efficiency of men employed on day rates is to assign them a fairly large amount of work and then let them go home when it is finished. The results that may be secured by this method under certain conditions are nothing short of marvellous. It is well known that in the southern cotton fields before the war it was a serious problem to induce the negroes to put forth their best efforts, and that the most satisfactory method was to assign them a task and allow them to quit when the task was finished. In this way an efficient negro could be induced to pick twice as much cotton as usual, and often finished his work by two or three o'clock. When this system is tried the workmen should have a fixed hour for starting to work, but should have no regular time for leaving. As soon as their task is finished they should be allowed to go home. At the same time it should be noted that this system is liable to the same faults as appear with ordinary piece-work. If the workman thinks that his leaving at an early hour will be a signal for the employer to increase his task on the

ground that it was not large enough in the beginning the plan falls to the floor at once. The work assigned should be sufficient to keep a man busy a good part of the day, and then the workman should be assured that no cut in his pay will be made and no additional work given him no matter how soon he finishes, except at his option on the basis of additional pay in proportion to any increase of work that may be suggested. Otherwise the workman will prefer to stay in the shop the full time and soldier on his work, rather than run the risk of having his liberty cut in half by a large assignment.

The foregoing method has found its most successful application in the case of the younger members of the industrial community. The wages of children usually go in large part to their parents, so that the ordinary inducements of greater pay for larger output often fail to have any effect on them. Piece-work and bonuses and premiums offer no attraction. But each child's play-time is his own, and he will often double his output in order to gain an hour or two of leisure at the end of the day. It is not necessary to point out that the ordinary precautions in regard to inspection of the product should be more than ordinarily strict in cases of this kind in order to prevent deterioration in the quality.

As with children, so with workmen of a low intellectual equipment and men who have little expectation or chance of advancement, the policy of allowing the laborer to go home when his task is finished has proven successful. The reason for this is that such men are not usually far-sighted enough to be willing to strive for future gains, even when that future is a

very near one. Here the prospect of promotion may not be sufficiently vivid to appear as a goal worth striking out for. Perhaps they are men who could not succeed in any higher grade of work, even if they were given a chance. In the illustration of the red credit cards given above, such a plan would fail with workmen not sufficiently far-sighted to see the increase of half a dollar a week ten weeks ahead. But to such men the prospect of an hour or two of leisure at the end of each day appeals very strongly, and they may be induced to push their work through at a high rate of speed in order to secure it.

5. Of interest in this connection is the so-called premium plan of paying for labor. It resembles the method last described in that a fair day's task is set and the workman encouraged to finish it as soon as possible. At the completion of the task, however, the laborer, instead of being allowed to go home, continues at work for the rest of the day and is paid a premium on the time saved, consisting of a fraction of the amount he has saved his employer by finishing his task quickly. This plan, while based on day work, partakes more fully of the nature of piece-work, and will be reserved for fuller discussion in a following chapter.

Perhaps a word may be inserted here in regard to coöperative or profit-sharing plans. There is not time to enter into a full discussion of coöperative enterprises, with their advantages and disadvantages, but it deserves mention as one of the devices invented to increase the laborer's interest in enlarging his output. Briefly and simply stated, under this plan the gross profits at the end of six months or a

year are determined and a certain percentage of these is divided among the workmen, usually in proportion to their rate of wages. The profit-sharing plan treats the business as a whole and the workmen in a body, the idea being that the workmen will feel an interest in lowering costs of production because the extra efforts they put forth will be rewarded at the end of the year by a larger distribution of profits. Coöperative experiments have had a wide success in Europe and particularly in England, but have not attracted much attention on this side of the Atlantic.

Except in certain industries and under special conditions the profit-sharing plan contains features that do not tend to make it a success so far as stimulating the workmen to their highest efforts is concerned. We have seen that an important aid in influencing men to do their best consists in holding out to them hopes of promotion or greater pay or some form of individual reward. Under the profit-sharing plan the rewards are paid out regardless of individual merit. The lazy and incompetent reap the harvest sown by the energetic and capable. There is no scope given for personal ambition. Unless all the workmen are imbued with a powerful interest in furthering the general welfare, the incentive to extra effort is lacking to the individual workman. He knows that his own faster pace, unless seconded by the efforts of all about him, will have no appreciable effect on his personal reward. On the contrary, he is liable to feel that his exertions are increasing the pay of the lazy fellow next to him. The tendency, therefore, is for all to slow down to the gait of the lazy and incapable.

A second count against the profit-sharing plan lies in the remoteness of the reward. Some men are possessed of enough far-sightedness to strive for distant benefits, but when those benefits are six months or a year away, and at that are shared by others and may be nullified by the laziness and inefficiency of others, the prize does not appeal very strongly to the average workman.

On the other hand, there are variations on the profit-sharing plan that have proven eminently successful in this country. Some establishments make a practice of sharing profits with foremen and heads of departments, or offer stock to them at specially favorable rates. As an incentive to extra efforts this device is much more powerful with the foremen and higher officials than with the ordinary workmen, and for several reasons. In the first place, though the common laborer will feel that extra exertions on his part will not have much result so far as his earnings are concerned, the foreman's efforts have a very appreciable effect on the gross earnings of the company. Good work on his part may save the company thousands of dollars. Second, the men higher up are generally of a superior mental calibre, who are capable of putting their best efforts into an attempt to secure a prize that is six months or a year away.

Thirdly, the heads of departments, being few in number and coming into close contact with one another, can plan together as to the best methods of reducing costs of production and increasing profits. The workman has no means of telling whether the

men outside of his immediate vicinity are pulling with him or against him.

The profit-sharing plan, then, has in general little to recommend it as a means of spurring the workmen to greater efforts. It would, of course, be a more potent force in the case of an exceptionally intelligent body of workmen. But as a rule, the fact that it makes no appeal to the personal ambition of the men, and offers a reward so remote as to be unattractive to the majority, nullifies any influence it might have toward lowering the costs of production.

CHAPTER XII.

EFFICIENCY AND WAGES; PIECE WORK.

Broadly speaking, there are in reality only two methods of paying for labor in common use. In the preceding chapter was considered the older, simpler, and more general method of paying by the day, or in proportion to the amount of time consumed. In this chapter we are to consider payment in proportion to the amount of work done, known as the piece-work plan. Strictly speaking, there are a number of other methods, some of which will call for treatment in their proper place, but when these are closely examined we shall find that, although they contain principles valuable in themselves, they are invariably only variations or modifications of one or the other of the two general methods.

Payment by the piece carries with it, of course, a careful and accurate measurement of the work done; and in principle, has the advantage over the day wage plan of rewarding the laborer exactly in proportion to his exertions. In principle it is the antithesis of the other, in that with day work the laborer has no direct interest normally in any increased production that he may bring about through more energetic or more intelligent efforts. He may have, as we have seen, an **indirect** interest in increas-

ing his output, in the form of increased pay, approval of the management, and hope of promotion, or even in the prospect of leisure hours at the end of the day. In fact, under the best type of day work, when accurate records are kept of the performance of each man and of his efficiency, when each man's wages are increased in proportion to his progress and those who fail are censured or discharged, and when the hope of promotion is given definite and concrete form, the indirect interest of the laborer in the quality and quantity of his output may be made a most powerful spur.

With piece work, on the contrary, the indirect interest in larger production becomes direct for the workman, and indirect supposedly, for the employer. That is, the laborer is not paid any fixed amount, presumably, but in direct proportion to his exertions; while the employer seemingly has no interest in the amount that each workman does, because each unit of product costs him in labor exactly the same amount whether it be turned out slow or fast. In actual practice, however, neither of these statements proves true. The workman invariably finds that if he earns too much the rate per piece will be cut, so that he is deprived of his direct interest in a large output. As for the employer, the increase in the overhead or indirect costs of production becomes so alarming if the work is not rapidly done, that his interest in a large output per man easily becomes direct. Thus it may be seen that piece work, even where it is practical, is not by any means an easy solution of the faults we have found in the previous chapter to be inherent in the day-wage plan. We

shall have to study the problem carefully in all its bearings before we can arrive at a conclusion as to the conditions under which the piece-work method of paying for labor will give the greatest satisfaction to both employer and employe.

As a preliminary to the study of this problem, it may be well to consider the conditions under which piece work is or is not preferable to the plan of payment by the day. Broadly speaking, piece work may be applied where the amount of work done appears in definite units of concrete form so that it may be measured. It will be remembered that there is a vast amount of work that at first sight appears so miscellaneous or variable in its nature that its accurate measurement seems impossible, yet which may be reduced to definite form by careful apportionment and delimitation. To the rule that payment by the piece may be made where the results appear in standard units of work done, certain exceptions have already been noted. To recapitulate:

1. Where scrupulous perfection of workmanship is necessary, it may not be wise to stimulate the workman to increase his output, for fear that imperfect quality will cost more than is gained in labor expense.

2. Where the quality is not easily tested by inspection, as, for example, in work done by a number of men, no one of whom can be definitely held responsible for imperfections. This may often be avoided by inspecting the work of each man as it is finished.

3. Where very delicate and valuable machinery

may be impaired by undue haste in running or using it.

4. Where the workers are kept involuntarily idle part of the time, they should be paid by the day at least during the time they are unemployed.

5. When new work comes in that has not been done before, or when new men are learning to do work that will require a period of training before they can become expert enough to do it fast, it is necessary to pay by the day until it becomes possible to judge what will be a satisfactory piece rate.

Antecedent to a clear understanding of our subject, will be a consideration of the objections most commonly offered against the piece-work system. These objections, with a word or two as to their validity, may be summarized as follows:

1. Many manufacturers fear to stimulate their men to greater speed by paying so much per piece, because they think that "haste makes waste," that any increased output due to greater speed will be accompanied by a deterioration in the quality of the product, and a greater waste of materials used. In work calling for great delicacy of touch and fineness of adjustment, where a single misstep would cost the price of many hours of labor, we have seen that caution is needed. As a matter of fact, such instances are rare, and can as a rule be easily recognized. In the generality of cases, what is needed is not avoidance of haste, but more rigid supervision and inspection. Experience has proved that men on piece-rate can, and will, turn out work of quite as high quality as those who are paid by the day and allowed to take their time. The use of modern methods and system

for insuring perfection of workmanship has in large part scared away the bugaboo of quality subordinated to quantity. The use of instruction cards and the employment of foremen and supervisors who will see that the instructions are carefully carried out; careful inspection of the work, and definite fixing of responsibility for imperfections; and lastly, accurate records, showing not only the quantity but the quality of the work turned out, have proved more than ample insurance against faulty products.

As for the idea conveyed in the proverb "haste makes waste," it is undoubtedly true that there are certain rare instances in which more materials must be used in accomplishing given results if the work is done fast. In certain branches of the textile industries, for example, machines that are run rapidly use up a greater amount of raw material per yard of product than those whose rate of speed is more deliberate, because of broken thread-ends that must be thrown away. This one factor causes an enormous difference in the methods of textile production in this country and abroad. In Europe the machines are run slowly, especially in the case of valuable fabrics like silk, in order to save all that is possible in raw material. In this country, the immensely greater cost of labor makes it necessary to run the machines at the highest rate of speed, in order to secure the greatest output per unit of labor, because the increase in the amount of raw material used up does not cost so much as the greater cost of labor required if the machines were to run more slowly.

It is seldom, however, that haste makes waste, in the sense that "waste" is the unavoidable concom-

itant of more rapid production. What is usually meant by this statement is that the workman will be more careless of materials if he is stimulated by piece rates to increase his output. It need scarcely be pointed out that this can be avoided even more easily than imperfection in workmanship, by careful supervision and the use of instruction cards. In fact, a considerable saving in materials has frequently been effected by greater division of labor, strict apportionment of the amounts to be used by the workmen, and proper supervision and instruction. Many manufacturers have found it profitable to employ special workmen to cut the stock to be used into the proper shapes and sizes, so that the operator who is to use it will not only find his work greatly facilitated, but will have no excuse for using up more than the most economical amount necessary.

Even where greater "waste" of material is inherently unavoidable in more rapid production, it becomes a question whether the gains, both in labor cost, and also in overhead expenses, do not more than compensate for the loss in materials used. The manufacturer who has at his command an efficient and accurate cost system that will show both the labor and overhead charges for each department, can easily determine this question by a little experimentation combined with a comparison of the records made by each method of production.

2. Another objection to piece work is based on the supposition that if too great stimulus is given to induce men to increase their pace, they will exert themselves to the detriment of their health,—in other words, "work themselves to death." While

this objection is entirely groundless in the vast majority of cases, there are certain instances in which it holds, and certain conditions under which workmen will overexert themselves. The sweatshop system in New York is a most notable case in point. There the influx of vast hordes of Jewish, Italian, and Polish immigrants, ignorant of conditions in a new country, scattered so that they cannot effectively organize, and eager to obtain work on any terms, has produced a set of conditions not duplicated anywhere else in the world. The clothing manufacturers, by a combination of piece work, task, and contract systems, are enabled to hire these men at rates so low that they have to work excessively long hours at breakneck speed in order to earn a mere livelihood. Fortunately, such conditions are not found in other places or other occupations. Another instance of overexertion is found in those rare cases where workmen will idle three days in the week, and work at top speed the other three days in order to make up a wage proportional to their standard of living. This, however, is due to the improvidence of the workmen, and could be done away with by setting a task to be performed each day. In general, experience has shown that laborers will not injure their health to bring up their earnings unless the rate of pay is so low as to make it necessary for them to do so in order to make bare living expenses.

3. Another objection often raised is, that the piece rates are too low. We shall have to consider, later, on what basis the rate should be made. It is enough to note here that this objection is no different in principle from the contention that the laborer is

not paid high enough wages generally, a discussion of which would carry us too far afield.

4. The most vital weakness of the piece-rate system lies in the fact that it almost invariably leads to systematic "soldiering" on the part of the workman, in order to deceive his employer as to the rate at which work can be turned out. This is partly due to natural laziness, the tendency to take it easy, partly to the "Lump of Labor" theory, but mostly to the practice of "nibbling," or cutting the rates on the piece which seems inseparable from this method of paying labor. Mr. F. S. Halsey, in arguing for his "premium plan," says that the fundamental defect of piece work is that its initial incentive is too high. Invariably the time comes, no matter how the price rate may have been computed, when the wage earned is too high for the labor employed. A cut in the rate, therefore, seems necessary. What most employers fail to see is, that this really makes the piece rate pay, from the workman's point of view, a system of penalties for doing well. It results naturally in a whole or partial cessation of speed effort on the part of the employe, which in turn causes loss from slow movement of stock, waste time on machines and equipment, and general increase in overhead expense. Thus the piece rate system generally operates to defeat the very object which it was expected to accomplish. This aspect of the case cannot be better given than in the words of Mr. Halsey, taken from an article in the *Sibley Journal of Mechanical Engineering* (Vol. XVI, March, 1902):

"A piece of work has been done by day's work, and it is proposed to change it to piece work. The

piece cost under the day system is first determined, and a somewhat smaller price is then set and given to the workman. If he has had no experience with piece work, he feels that he cannot 'make wages,' and objects. * * *

"No man knows what he can do under an incentive until he has tried it. The workman, in saying that he cannot make wages at the piece prices offered when piece work is first introduced, is entirely sincere, but he is nevertheless mistaken. All experience shows that when the test comes, the increase of output under the incentive of piece rates is far beyond what anyone—manager or workman—would have believed possible. The output mounts up, and the wages go with it; and the employer soon finds that he is paying an extravagant rate of daily wages—an extravagant rate being understood as a rate materially in excess of what it would be necessary to pay another workman for doing the same work, he having the other man's experience before him. The employer submits to this for a time, but the wages continue to increase; and ultimately he is driven to his only recourse,—he cuts the piece price. This is an immediate announcement to the workman that the promises of piece work are false. He was told that he would be paid a certain rate per piece, but he finds that to be true up to a certain limit only. The workman, under compulsion, accepts the new price, but unless he is very dull, he has learned a lesson. If he is very dull, it may require a second cut to enforce this lesson; and this second cut, either on the price of his own work or that of some fellow-workman, is soon forthcoming. The lesson is that if he pushes

his production to a point which raises his earnings beyond a certain more or less clearly defined limit, the direct result will be a cut in the piece price. Perhaps new men come in, or the old ones are given new work to do; the result is the same. If any one is so unwise or so unfortunate as to do a large amount, he is at once punished for it by having his rate cut. Such cuts, from the workman's point of view, have but one result; he is compelled to work harder than before, but he earns no more."

The foregoing arraignment of the piece-work system is fully justified by the facts in thousands of instances. In fairness to the system, however, it must be said that such extreme conditions are not universal. In practice they are found only when, in the first place, due thought and consideration have not been given to the determination of the piece rate in the beginning; second, where the management is inexperienced in handling the system, which perhaps amounts to the same thing. It is perhaps not true that the workman is totally unfair in his attitude toward a cut in the rate when the rate is easily seen to be excessive. The writer has talked with workmen on this point, and they seem as a rule to be fair-minded about earnings that are really excessive. Two workmen in an agricultural supplies manufacturing company agreed perfectly that when the piece work on which they were engaged was started, they earned more than the company could afford to pay. "When this was first put on piece rates," one of them said, "we kept earning more and more, until we were drawing twenty-five and even thirty dollars a week. We knew it couldn't last, because the boss

could easily get men to do it for fifteen. When the cut came, we expected it, and acquiesced readily, merely congratulating ourselves that it had not come sooner."

"But, if you had not earned so much?" was suggested.

"Yes, if we had not earned so much in the first place," was the reply, accompanied by a glance at his friend as if to say, "That's where we made our mistake. If we had not speeded up at first, there would have been no excessive earnings, consequently no cut in the rate; consequently we could now be earning our eighteen dollars a week, with much less effort than we actually have to spend with the rates reduced."

There you have the situation in a nutshell. The employes are not unreasonable about excessive earnings. They know that when earnings get too high, the rate will be cut because the management can hire somebody else to do the work cheaper. But they are not blind to their own interests. Their only gain can come from not earning excessive wages. Since they cannot gain in money, they can at least see to it that their wages come to them as easily as possible, so they conceal the amount of work that can be done, by systematic "soldiering." This soldiering is often applied at the beginning, when the rate is started, and systematically carried out in subsequent operations. Expert investigation has shown that the amount of such soldiering is almost beyond belief. Doctor Taylor says that it is not unusual for a man to soldier to the extent of 400 per cent. At a recent meeting of a manufacturers' association, one mem-

ber made an address in which he declared that recent investigations had convinced him that all the establishments in the country did not turn out **on an average** more than one-third of what would be possible if the organization and system were efficient enough to enable them to realize all that could be done in the way of a larger output.

An illustration from the writer's own experience will show what may be regarded as a typical situation under the piece-rate system. When a mere lad of seventeen, he spent a summer vacation working in an electrical concern. The foreman told him that he was supposed to earn about 20 cents an hour. One day a number of small coils, thirty in all, came to him to be insulated, on piece work. The rate was 10 cents a coil, and each one was supposed to take about half-an-hour. At this time the writer had not been in the shop more than a few days, and was absolutely "green" at the work. But he set to and finished the thirty coils in three hours, an average of six minutes to the piece. As he started to turn in the time on the work, his neighbor asked him how long it had taken. On being told, the man cried in horror-stricken tones, "For Heaven's sake, don't turn that in!" A conference of the older men was held on the spot, and a gray-headed workman spent half-an-hour explaining to the "green hand" what it would mean to everyone if so outrageous a time were to appear on the company's books. The time, as finally turned in, was made twelve hours instead of three; and the writer spent the rest of that day, and most of the next, undoing his work and doing it over again, in

order to give an appearance of bustling activity to his presence in the shop.

What is really needed to prevent soldiering on piece work is, first, an accurate determination of what is really the minimum time in which an average or first-class man can complete a job; second, a sufficiently large increase in the pay to induce the workman to use his utmost efforts to attain this minimum or standard time; and, third, an absolute assurance that the piece rate, when once set, will not be cut for a very considerable period. Let us consider these features in turn.

The determination of standard times on machine operations has already been discussed in a previous chapter. There it was discovered that greater efficiency in machine operations leads to saving, not only in showing the workman how to carry on his work in the quickest time, but also through the discovery and use of the best metals, the best cutting angles, the best feed and speed. The determination of the quickest time for other than machine work has already been touched upon; for a fuller consideration of this important subject, we shall have to take up a discussion of Dr. Taylor's "Study of Unit Times," in which he attempts to determine with scientific accuracy the standard minimum time for work of any kind.

To induce men to work at their maximum speed, it is absolutely necessary for the employer to abandon all ideas of a fixed minimum beyond which the workman cannot go. A very considerable increase in the average rate of pay, together with an assurance that the rate will not be cut, will invariably

work wonders in the way of enlarging the output. The exact percentage by which wages must be raised to secure the proper results, will vary according to the nature of the work and the intelligence of the workman. The experience of those who are skilled in this kind of work has brought out certain more or less definite standards. For ordinary kinds of work, not requiring special skill, very close application, nor extra hard exertion, it is necessary to pay about 30 per cent more than the average. For ordinary day labor not requiring special skill or intelligence, but calling for strength and severe bodily exertion, pay 50 to 60 per cent above the average will secure the best results. If the work calls for intelligence and skill and close application, such as the more difficult and delicate machine work, an increase of 70 or 80 per cent will be required. If the maximum speed will call for severe bodily exertion and close application from men of brains, intelligence, and skill, it may be necessary to double their wages in order to induce them to take on the high rate of speed.

These increases will cause many an employer to throw up his hands in dismay. Yet if it is possible, as the experience of those who have tried it abundantly prove, to get three and four times the ordinary output by these methods, the saving will be simply tremendous. The percentages of increase shown above have been tried and tested. If less is paid, the workmen will, as a rule, prefer their old rate of speed at their old rate of wages. Men will not work at their best unless assured of a liberal increase of pay, and this increase must be permanent.

On the other hand, the increase should not be

more than is necessary, for the good of both the employer and the workman. It amounts to a truism to say that it is necessary to pay what is necessary to get work done, but no more. It may be said that the workman, if asked to treble his output, may claim that his pay should be trebled too. But as we have seen in the case of standard times for machining, the increased output is as much due to new methods, better tools, instruction cards, and more efficient supervision, as it is to the increased exertions of the workmen, a fact which the latter will readily concede. Experience has shown that the real difficulty consists in persuading the men that the management really intends permanently to pay them 50 or 100 per cent more, on any terms or any conditions, and is not concealing an attempt to find out just how much can be done in order to force them to do it at the same old wage.

It is not, as a rule, for the good of the workman to overpay him. He is liable then to work irregularly, to become dissipated and extravagant. Most men cannot stand too great or too sudden riches. This is particularly true of men of low mental caliber, and furnishes one of the reasons why the increase on work of a low grade should not be so large as in the case of skilled and intelligent workmen.

The third requirement is that the piece rate, when once determined, shall not be cut, and an assurance to this effect should be given to the men to cover a considerable period. The application of this simple principle alone, leaving out of count all other devices for increasing the efficiency of an organization, has often produced remarkable results.

Not long ago an agricultural manufacturing concern had at its head a man who had a "twist" in the direction of reorganization. He was constantly shifting foremen and job-bosses and supervisors from one department to another, constantly installing new systems of cost-accounting and stock routing, constantly setting up and deposing new officials in office, in accordance with whatever scheme was uppermost in his mind. These kaleidoscopic changes at first worried the men and the officers considerably; but gradually they got used to the lightning-like shifts, and let the "chief" have his way so far as surface conditions went, but in reality there was very little change in the methods and processes of manufacture. The vagaries of the head executive would ordinarily have plunged the establishment into ruin within a year or two, because no business can work efficiently while in a state of constant topsy-turvydom. Yet the fact that he rode his hobby only on the surface, and made no attempt to explore the depths, actually kept the concern out of hot water for a long time.

Gradually, however, the dividends began to decline, and the directors became suspicious that all was not well. The executive was called into a directors' meeting, and was told that, while they had not lost confidence in him, they suspected that his methods might be partly responsible for the decline in the dividend rate from 10 to 2 per cent. According to all indications, there would probably be a deficit soon if "something was not done about it." They suggested that he call in some bright and energetic man as assistant manager, give up his own plans for

awhile, and put faith in the suggestions of someone from the outside.

The chief executive was frightened. But true to his tendency to do something new and startling, he called in a young man from an industrial school, explained the situation, and told him to go ahead. The young manager looked over the field, spent many hours over the books of the company, had several conversations with the workmen and foremen, and finally sized up the situation pretty well. Imagine the surprise of everybody, from chief executive down, when the next morning the following notice appeared in large type in a prominent position in each room of the establishment:

IMPORTANT NOTICE

The Starr-Roe Harvester Company hereby guarantee that during a period extending two years from date of this notice, there will be no lowering of rates on piece work. The company will be glad to have the workmen earn as much as possible during the period covered by this guarantee.

(Signed)

July 22, 1908.

J. B. McManus
Asst. Manager.

The chief executive read the notice, and gasped. This was a violation of one of the most sacred rules of the art of management. The profits of the company would be instantly eaten up in high salaries. When the new manager, hastily summoned, came into the private office, he found his superior with flushed face and kindling eye.

"This is a pretty mess," exclaimed the chief executive, "are you aiming to plunge us into ruin?"

"Not at all," was the calm reply. The new manager pulled a bundle of papers from his pocket, drew up a chair, and spread the papers before the older man.

"Here are the cuts in piece rates that were made last year," he continued, pointing to the figures. "Here are the products made on the cut rates, and here are the savings made by the lowering of the rates. As you can see, the amounts saved were comparatively small. On this other sheet is an estimate of what the company would have made if the output had been one-third larger with exactly the same equipment and plant, and no cuts had been made. At a low estimate dividends of 12 per cent could have been declared. The promise not to cut the rates will, at the worst, cost the company little or nothing; and unless I am very much mistaken, will increase the output by more than one-third."

The chief, half convinced, finally agreed to give the plan a trial, especially as the mischief had been done by the posting of the notices. As the days went by, and salaries mounted higher and higher, the directors came in and stormed and protested. The manager was there with his figures; and as the growing output of the plant gave more and more weight to his words, the opposition died down. At the end of six months the output had increased to nearly two-thirds more than normal, and a semi-annual dividend of 10 per cent was declared. In addition to this, a considerable amount was set aside for surplus, to carry out plans for new equipment and a department of experiment and test.

From a scientific standpoint, this was a rather

drastic and expensive method of increasing profits. The workmen who doubled and trebled their output under the new plan were paid double and treble their previous wages, though they would have been willing to do the same for half as much again, or some smaller proportion of increase in pay, if only assured that there would be no reduction in the piece rates. The manager of the above concern is now standardizing the tools and equipment, carrying on experiments to determine the standard times for machinery, and making a study of unit times, in order to make the data so secured the basis for a new set of prices on piece work when the period covered by the guarantee shall have expired. When that has been done, the establishment will be equipped and organized to realize all its possibilities in the way of low cost of production, and large earning power.

So deeply engraved in the manufacturer's mind is the idea that cuts in piece work are necessary, that it is almost impossible to find one who will admit that the plan is vicious in its effect on the output of the workmen. This is partly due to the fact that the workmen are not, as is often supposed by theorists, wildly outrageous when a reduction is made in a rate that appears unreasonable. It is not true, as Mr. Halsey indicates, that "the workman of course looks upon these cuts as an exhibition of pure hogishness on the part of the employer." The workman is as ready as any one to recognize the fact that when a \$10 man begins to earn \$25 or \$30 a week, the rate must be cut, because the employer could easily get another \$10 man to do the same work for \$12, say, with the first man's experience to go by.

But right there is where the hidden evil in the rate-cutting system comes in. The workman knows that the rate will and must be cut **if he begins to earn too much**. All he has to do is to take good care that he does not earn too much. Then his employer will have no excuse to cut the rate, and he can earn his little salary at an easy gait instead of earning the same amount at a fast one.

This is the side of the situation that employers cannot see. Their failure to realize the employe's interest in this regard is responsible for much of the topsy-turvey advice that is often printed by managers who have had considerable experience in handling men, but whose outlook on the situation is confined to a plane above that in which the actual workers dwell. Thus we find writers in business magazines maintaining that the piece-rate system is all right as it is, if care is exercised in handling it; that too sudden slicing off of the price is what causes trouble; and that there will be no dissatisfaction on the part of the laborers if the desired cut is made gradually and moderately, step by step, until it has been reduced to the necessary point.

Very true, the laborer will not complain under these circumstances. And what is this "necessary point"? Who decides it? The laborer himself, ninety-nine times out of a hundred! When he thinks that the cuts, made moderately and gradually, have gone far enough to satisfy the employer and to keep him from dying of ennui while on the job, he puts a stop to further cuts by failing to earn more than his average rate of pay. Thus on the insulating of the induction coils above referred to, on which the

price was ten cents a piece; the first man on this job did the work in fifty minutes, and the company set a rate of 18 cents on the work. Then the workman reduced the time to forty-five minutes, and the price was reduced to 15 cents. Thus gradually the times, as handed in by the workmen, were reduced to thirty minutes, and the price was cut to 10 cents. At that point the operators decided that price cutting had gone far enough, and carefully refrained from earning more than 20 cents an hour on them. The management saw that three cuts had already been made, that the records showed a fairly average time of thirty minutes, and decided that the minimum or "necessary point" had been reached. As we have seen, the workmen took good care to see that their employer should continue happy in that belief, though, as a matter of fact, neither skill nor experience was required to do the work in one-fifth of the time supposed to be the minimum. This minimum, fondly supposed by the manager to have been reached by his skill in handling piece-rates, was really decided and maintained by the workmen in their own interest.

These very cuts in the piece rates had been foreseen and provided for by the workmen, and therefore aroused no opposition. The men knew that the management would not be satisfied until the rate had been cut a few times. All they had to do was to allow a sufficient margin on the first few records. The case is similar to that of a horse dealer who, wishing to sell a horse for five times what it was worth, first named a price over eight times its real value. The prospective buyer, when he had beaten

down the price to five times the horse's value, thought he had thereby procured a bargain. The employer, finding that his men present little real opposition to the first two or three cuts in the price, concludes that the way to get a minimum bargain price is to cut down the rate, "moderately, step by step, to the necessary point."

But there is another and deeper reason for piece rate cutting, besides the fact that the employer thinks that it can be done without any evil effects. This reason is ably set forth by Mr. Halsey as one of the faults of the system:

"While the employer may take undue advantage in this way," (that is, may "nibble" at the rate when there is no necessity for it), "the fact remains that if he does not make the cuts he will eventually do it from necessity, for it can be shown that these cuts are an integral part of the piece work plan, which can no more be operated without them than a wind-mill can be operated without wind, and for the reason that, as years go by, the whole tendency of prices is downward. There are, of course, periods of advancing prices, but they are short-lived, and are nothing but incoming waves of the receding tide. The tendency through a series of years is downward and this must be so. It may also be said that this is what industrial civilization is for—to make things cheaper. The whole industrial world is engaged in a ceaseless effort to reduce costs, in order to reduce prices; and with so much effort it would be strange if there were not some success. With this future of falling prices before him, no manufacturer can contemplate paying the same piece rates ten years hence, that he pays

to-day. In normal times, most manufacturing enterprises are conducted on a small margin of profit; and with a future of falling prices before him, no manufacturer can continue to pay for his work materially more per piece than his competitors pay. The simple fact is that uncut piece rates lead to rates of wages which, under conditions of competition between manufacturers, cannot be maintained."

It may easily be agreed that this line of reasoning applies to any method of paying labor, since the tendency of everything manufactured is toward a reduction of cost, and therefore the labor cost on all articles must be reduced as time goes on. But on examination of the statistics for wages and prices, we find a strange anomaly. A glance at the figures giving the prices of manufactured articles shows, as above stated, that there has been for the past forty years a gradual but continuous reduction in price, and presumably a corresponding reduction in the labor cost of manufacturing. But do the wages statistics tell the same story? No; the average wage for all classes of labor has risen as steadily as prices have fallen. In other words, the decrease in cost has not been accompanied by a corresponding decrease in wages. It has been accomplished by a steady improvement in industrial organization and methods, by new and better machinery, by greater division of labor, by a steady increase in the application of methods by means of which the laborer has been enabled to enlarge his output without any greater effort on his part.

But this evolution has had a particularly evil effect in inducing systematic soldiering on piece work

and in furthering a costly policy on the part of manufacturers with regard to the management of this kind of work. When a man employed by the day is given a new machine, or shown a new method by which his output may be increased to double what it was before, he has little interest in the amount of his output; and in the absence of any incentive to soldier more on the new work than he soldiered in the past, he will exert himself to about the same extent, and his output will be about doubled.

But in the case of new methods or machinery with piece rates, the workman keeps a very close eye on the amount of his output. It is to his interest to soldier as much as he possibly can for the first few times, and to conceal in every possible manner the extent to which the new method will really increase the output. The lower labor cost on new jobs, in the case of day work, does not appeal vitally to the workman as a method of inducing him to do more at the same wage. On piece work, the actual definite cut in the price per piece is full of meaning to the workman. Having seen one cut made, he does not know definitely when another cut may be forthcoming, but he knows that it will come if he begins to earn too much.

The employer, having made a reduction when the new process was introduced, and seeing so plainly the saving in the labor cost per piece from this action, does not make any distinction between a cut justified by more efficient and easier methods, and one made because he thinks the workman will "stand for it." Failure to make the distinction, leads to the fatal policy of "gradual and moderate cuts to the neces-

sary point." The workman, knowing that the management has placed no **definite limit** on the number or extent of the reductions that may be made, is forced to protect his interests by concealing the amount of work that may be done.

We have seen that the nature of industrial progress is toward lowering of prices, and that the introduction of new methods of machining, handling, and so on must increase the output per workman. This brings it about that, under conditions of industrial competition, there must, at times, be a reduction in piece rates. But the policy of cutting rates has just been shown to be productive of every form of soldiering, and of the systematic limitation of output on the part of the workman. Are we then caught in a labyrinthine maze? Must we run around in a circle, arriving nowhere? Not at all. A simple, easy, and practical way out of the difficulty is to be found by placing some clean-edged, definite limit on the cutting of piece rates.

This may be done in one of two ways. In the case of the agricultural manufacturing company cited above, the manager accomplished the desired result by promising that there would be no reduction in piece rates for a period of two years. This policy left the workmen free to earn as much as they pleased, without fear of having to do more work for the same pay for a length of time sufficient to take from them all motive to soldiering. Some of the best-managed establishments in the country are now adopting this policy, guaranteeing the workmen against reductions for a shorter or longer period of time. While it is true that no manufacturer could

face the prospect of paying the same piece rates ten years hence that he pays to-day, he is entirely safe in the majority of cases, in making a guarantee to cover one or two years. By strictly keeping faith with his men during the time period stated, the employer will have no difficulty at the expiration of the guarantee in making a new adjustment. The new arrangement may be based partly on the improvements in methods and processes that have taken place during the period, and partly on the records that have been made by the workmen. When adjustment has been completed, a new guarantee of freedom from cuts for another definite period should be made.

It may be said that any attempt at readjustment will be met by a storm of protest. The ten-dollar workman, who has been earning 30 dollars a week right along, might object strenuously to having rates cut so that he will be able to earn only 15 or 20 dollars. Yet the situation in this case is far different, both practically and theoretically, from that where a policy of continuous and gradual reduction is pursued. The workman is not unreasonable in this matter, and keenly appreciates straight dealing and fair play. If he has been earning 30 dollars for work that his employer could get another man to do for 12 or 15 (after the first has reached his maximum speed), he will thank his lucky stars that the employer has kept his word and allowed him to earn big wages for so long a period. When the one or two year period is up, he cannot consider a readjustment unfair, because he has been sufficiently advised that the change would come at just that time. And with his past high records and large earnings as evidence that the

rates are too high, he cannot conceal the amount of time in which the work can be done.

But the employer must remember that it is neither fair dealing nor sound policy to cut the rates so that at his maximum speed (and by **maximum** we mean the largest output consistent with good health and good workmanship) the workman will earn no more than he did at his old slovenly gait. It is not fair dealing, because when the laborer is working harder he should be paid more. If the ten-dollar man, even at the end of two years, has his rates cut so that he can earn only 10 dollars again, the guarantee policy becomes nothing more than an underhanded device to induce the workman to toil three times as hard for the same pay in the long run. It is not sound policy, because a good round sum in addition to his ordinary pay is necessary to induce a man to put forth his best efforts. The ten-dollar man will not do his best for 10 dollars. He may not do it for 12 or 14 or even 15 dollars a week. Rather than work at his maximum for 12 dollars, he would probably prefer to hire out to somebody else who will only pay him 10 but will allow him to take his own time. But if still allowed to earn 15 to 20 dollars at the new rates, as the necessities of the case may require, the increase from 50 to 100 per cent over what he could make elsewhere, an amount which he knows from past performances he can earn, will be sufficient to keep him, and will still induce him to do his best.

It is not urged that the foregoing plan is the most economical in all cases, or even in the average case. It has, however, the merit of extreme simplicity; and

wherever it has been given even a fair trial, it has effected tremendous savings in production costs. Scientifically speaking, it is a rather expensive and roundabout method of arriving at the goal of maximum output at lowest cost. The guarantee plan involves paying a large number of workmen, for a considerable period, possibly twice as much as is necessary to induce them to do their best work. The ten-dollar man would do his best for fifteen, but who is earning thirty, cannot be touched until the guarantee period is over. Moreover, as we have seen in the case of machine operations, the workman cannot, alone and unaided, realize the maximum possibilities of efficient production, because he knows nothing of the problem of finding out the best tools, the best feed and speed and driving power. Even if under the greatest stimulus possible to increase his output, he can only hasten his old wasteful methods.

The most economical method of reducing costs under favorable conditions is to establish a department of tests and experiments, find out the standard times for each operation, make out instruction cards, and put in the new processes at 30 to 100 per cent increase in pay, as fast as they can be introduced. But all this takes time, and conditions may be far from favorable. It may be difficult to get the proper men for carrying on the experiments; the management may be so embarrassed financially that it could not undergo the expense of establishing a new department, hiring high priced men to make tests, and buying standard tools and equipment, until larger earnings provide it with more funds; the men may be extremely suspicious of the new plan, and may op-

pose it so effectually that a long, tedious campaign of education will be necessary before the most efficient methods can be installed. In such cases, the guarantee plan will often prove a most effective first step. It costs absolutely nothing to inaugurate, and is so simple that a child can understand it. It arouses no opposition. It begins to earn money from the start. Moreover, it oftens paves the way for an easy introduction of standard times and instruction cards.

When the workman is endeavoring to conceal the time in which a job can be done, in order to avoid a cut in the rate, any attempt to introduce a system that will practically force him to work at his maximum will be met by all the opposition he can muster. The promise of a 50 per cent increase in pay if he makes the standard time, appears to him at first as a deceptive bait, because he will not be convinced that standard time can be made until he has seen it done over and over again. But under the guarantee system the workman is not under any incentive to go slow on his work. He is anxious to secure as large an output as possible. If, now, his foreman comes to him and tells him that the department of tests has discovered a number of improvements on his old methods that will enable him to save ten or twenty minutes on each job, by closely following instructions, he will be eager to adopt the new plan, because he is protected against a cut by the time guarantee.

Another method of securing the reduction of price rates that industrial progress and competition make

necessary, and yet of avoiding the fatal policy of general and indiscriminate rate cutting, is to guarantee the workmen against reductions unless there be some radical change in the methods, progress, or machinery, such as would justify a readjustment. It is easily seen that this plan is not so simple or so easy of application as the foregoing, nor is it of special value as a "first aid to the injured." It cannot be satisfactorily adopted until the minimum standard times for all operations have been determined and installed, and the piece rates adjusted to the amounts requisite to secure the desired results.

If such a plan (which we may call the proviso guarantee, to distinguish it from the time guarantee above described) were adopted as a first step, the workmen would regard it as a farce. They would feel that the employer could use the proviso as a loophole of escape from any rate he wished to change, and there would be no attempt to make larger wages under cover of so flimsy a protection. Even if the production were increased, the employer would be prevented from making any readjustment of rates except those justified by a considerable improvement in methods or machinery.

The proviso guarantee has this advantage, however, that when conditions are such as to enable it to work properly, it allows an immediate adjustment of pay to the conditions of industrial progress. If it is to work properly, the employees must have implicit confidence that the management will not use the proviso unfairly. For this reason, the proviso guarantee is particularly well fitted to follow a previous time guarantee, if the provisions of the latter

have been honestly observed by the employer. The workmen by that time will have become convinced that the employer is anxious to give them a "square deal," that he is not roaming around seeking what piece rate he may devour, and that he will make only such reductions as are clearly justified by improvement in tools or in the processes of manufacture.

CHAPTER XIII.

EFFICIENCY AND WAGES; THE PREMIUM AND CONTRACT PLANS.

In the preceding chapters we have seen that, theoretically speaking, the day rate and piece rate plans affect in directly opposite ways the interests of employer and employe in the amount of output from a given plant and labor force. Under the day rate system the workman has no direct interest in the rapidity of his output, and can be spurred to higher speed only by applying a strong indirect interest in the form of definite promise of higher pay or of promotion in case he shall reach a certain standard of output or of workmanship. With the piece-rate system the employer has ostensibly no direct interest in larger output, because his labor cost remains the same per unit of product. But in this latter case there are several side issues that obscure and complicate the problem.

First, the employer's indirect interest in enlarged output per unit of labor is very great; in fact, much greater than the employer himself usually supposes. The indirect cost, for heat, light, and power, for interest on plant, machines, and equipment, for selling organization and slow movement of stock and slow deliveries, comes to so large an amount that the interest of the employer in rapid production, though indirect, is tremendous.

Second, the workman has not, in the vast majority of cases, nearly so direct an interest in increasing his speed of production as the piece-rate theory would lead us to think, because he knows that if his earnings amount up to a certain point, the rate will be cut. His choice therefore lies between an easy gait and a fast one, at a certain fairly fixed rate of pay per day.

Third, the cutting of rates on piece-work is an integral part of our industrial system, because improvements in machinery and processes of manufacture are going on at all times; prices are going down; and if the rates were never cut, the manufacturer in a few years would find his costs of production greater than his selling prices. The fact that piece rates must be cut sometimes, and that in each particular case where a cut is made there is an obvious saving in the labor cost of the article manufactured, has led employers into the policy of reducing rates on every possible occasion, disregarding the fact that this policy offers every inducement to the workman to slow up on his production, to conceal the amount of time it takes to do a job, and to further his interests not by earning more money, since this is denied him, but by working at his leisure.

Several methods of avoiding the apparent deadlock between the interests of the employer and those of the employe have been considered. The simplest of these is the time guarantee: a promise on the part of the employer that the rates on piece work will not be reduced for a period of time long enough to induce the workman to give up his apparent advantage in concealing his rate of output for the sake of

the high wages he can make during the period of the guarantee. If a man knows that he can earn double or treble wages for a period of, say two years, although he knows that a re-adjustment will be made at the end of that time, he will seize the present gains, and let the future take care of itself. Even if he thinks the employer will take advantage of his high records to cut the rates, so that he will be doing three times as much work for the same pay as before, he will at least have two years of high pay to his credit, and at the worst he can hire out somewhere else, where the old pay is linked with the old rate of output. If the guarantee is not made for a long enough period, the plan will not be effective. In this case the workman will put his future advantage ahead of present gains, and will soldier on his work as before, in order that when the readjustment is made the employer will have no basis of high records on which to cut the rate. For this and other reasons, the time guarantee plan is rather expensive to employers. It is expensive, not in the sense that it will not effect immense savings in costs over the old plan, but in that it involves paying much more than is absolutely necessary to produce the desired results.

To induce a workman to exert his best efforts, it is not necessary, as we have seen, to pay him an amount directly proportioned to the results he achieves, provided only there is a satisfactory increase of pay which the employe need not fear will be reduced. A man who is turning out only one-third or one-fourth as much as would be possible, —and soldiering to this extent seems to be the rule

rather than the exception,— it is not necessary to treble or quadruple his pay in order to induce him to turn out three or four times as much as before. He will do his best for an increase of anywhere from thirty to one hundred per cent over his average pay, provided only the increase is permanent. Thus the simple time guarantee plan is expensive to employers; for while it will effect enormous savings in the indirect cost of production, all the direct gains from larger output go to the employees. Where this plan is put through, the employer finds himself bound for a long period to pay his workmen perhaps three or four times their previous wages, more than double the amounts that a more scientific arrangement would find necessary, to bring about the same results.

The time-guarantee plan has the advantages of extreme simplicity and instant effectiveness. While it is expensive, there are conditions under which it will be preferable to any other method. It is obvious, however, that part of the expense connected with this plan would be done away with by some arrangement by which the direct gains from larger output could be divided between the employer and the employee. Such an arrangement can be found in what is known as the premium plan of paying for labor. To understand this plan, we cannot do better than to quote from Mr. Halsey, in the article above referred to.

“To understand this, suppose that a piece of work has been done upon the day’s-work plan, and that it is proposed to change it to the premium plan. The time which it has required is determined, and the workman, who is still paid the old day rate, is told that if he will reduce that time he will, in addition

to his daily wages, be paid a premium for each hour or part of an hour by which he reduces the time, this premium per hour being less than his hourly rate of wages. Please note this, as it is by this device that the division of the gains is made. If he objects, he is simply told, 'Very well. Try or not, as you think best; there is the work and the offer, and the premium is ready whenever you have earned it . . .' It is of course expected, and usually found, that with this reward before him the workman will sooner or later endeavor to increase, and will succeed in increasing, his output.

"To gather the exact workings of the plan, assume a concrete case. A workman is paid, say, \$3.00 per day, and produces one piece of a kind per day,—that is, in 10 hours. He is told that he will continue to be paid his \$3.00 a day as before; but that if he will reduce the time on the piece, he will be paid, in addition to his wages, a premium of 10 cents for each hour saved. If he reduces the time by an hour, that hour represents in money value a gross saving of 30 cents. Ten cents of this amount is paid him as a premium, leaving the remaining 20 cents in the employer's possession, this sum making itself manifest in the reduced cost of the work. If the workman goes on reducing the time in which the piece is made, the same process is repeated, each hour saved resulting in an increase in the workman's wages of 10 cents, and in a reduced cost of the piece of 20 cents. In other words, the wages go up and the costs go down simultaneously, this apparently paradoxical result coming about from the fact that the gross time saved is divided between employer and

employe, part of it going to increase the wages of the latter, and the remainder going to reduce the cost to the former. This is shown in the accompanying table, which, for purposes of illustration, is extended until the workman has doubled his output, in which case the wages cost of the work has gone down from \$3.00 to \$2.00, while the workman's earnings per day have advanced from \$3.00 to \$4.00.

THE WORKINGS OF THE PREMIUM PLAN.

1.	2.	3.	4.	5.
Time consumed,	Wages per piece	Premium.	Total cost of work, Col. 2+3.	Workman's earnings per hour, Col. 4÷1.
10 hours	\$3.00	\$0.00	\$3.00	\$0.30
9 "	2.70	.10	2.80	.311
8 "	2.40	.20	2.60	.325
7 "	2.10	.30	2.40	.343
6 "	1.80	.40	2.40	.366
5 "	1.50	.50	2.00	.40

There is, of course, a considerable gain to the employer, due to the increased production from a given plant, since the secondary costs of production,—the expense items which make up the burden, and which must be added to the cost of labor and material in order to obtain the ultimate true cost,—are increased but little in consequence of the intensified production."

It will be seen at once that, though this plan starts out on a basis of day's work, it can easily be adjusted to piece work as well, and when fully under way, really becomes a piece-work proposition. Thus when the workman has reached the point where he can do the work in five hours instead of ten, he is really paid \$1.50 for each job. If he should reduce the time to four hours, his rate would be \$1.20 per

piece. But this automatic cutting of the rate per piece is done entirely at the workman's option, and is compensated for by an increased rate of earnings per hour. The fact that there is no compulsion about the plan, that the workman can take it or leave it as he thinks best, is an advantage which it enjoys in common with the time guarantee system.

There are certain disadvantages connected with the premium plan, which ought to be taken into consideration before it is applied.

First of all, it is not so directly effective as the time guarantee plan. As can easily be seen, there is not nearly so great an incentive to the workman to put forth his best efforts at the start. Men who have been plodding along, taking ten hours to do a piece of work, are not, as a rule, fully aware of the extent of to which they have been soldiering. Just as a man who is first introduced to piece work is sure that he cannot "make wages" at the price set, so a man who has taken ten hours on a job is inclined to smile ironically at the idea of there being "anything in it" for him when he is offered only 10 cents an hour for each hour saved. He is liable to think that he could save half an hour, or at best an hour, by working particularly hard, and the prospect of putting forth all this extra effort for the sake of 5 or 10 cents does not appeal to him. Days, weeks, even months may elapse before the workmen become educated to the real importance of the opportunity that is offered them to make higher wages by this plan. If the men knew at the start that they could ultimately do in three or four or five hours the work that now takes ten hours, the prospect of a definite

large amount of higher pay in the future would spur them immediately to greater effort; but ordinarily they cannot see this. The result is, that conditions may go on for a long time as before, without any advantage accruing from the adoption of the plan, either to employer or to employe.

Parenthetically it may be noted that here is illustrated one of the disadvantages of not having a department of tests which would make a study of the time required to do work. If it could be pointed out to the men at the beginning that a ten-hour job could be done in three or four hours, there would be no difficulty in making them see what a premium of even 10 cents per hour saved would bring to them ultimately. In the absence of a time-study test department, the simple time guarantee plan will bring better immediate results; and where this is of prime importance, it will be preferred to the other.

It might be said that the delay incident to the smaller incentive to the workmen under the premium plan can be done away with by increasing the premium. The proportion of the gains which should go to the workman under this plan will demand careful study in all cases. Mr. Halsey favors giving the laborer one-third. If the laborers were given one-half, or two-thirds, it is undoubtedly true that the incentive, both immediate and ultimate, would be productive of larger results.

The trouble with this plan is that as time went on, the workmen would begin to earn so much that there would have to be a cut in the rates; in which case the premium plan would be worse, as a permanent solution of the problem, than the time guaran-

tee with a readjustment at the end of one or two years. It will not secure the large output at the beginning, and the workmen will object more to a readjustment when they are getting only part of the direct gains from larger output than when they are making more obviously excessive wages from getting the whole. Any change in the time base on the premium plan, after it is once set, is particularly to be avoided. Yet a premium that is too large will ultimately bring a rate of pay that is much more than necessary to induce the workman to turn out the maximum. This may be seen by carrying out the idea in Mr. Halsey's table on the basis of a premium equal to one-half and two-thirds of the gains from time saved.

PREMIUM OF ONE-HALF.

1.	2.	3.	4.	5.	6.
Time con- sumed, hrs.	Wages per piece, dollars.	Premium, dollars.	Total cost work, Col. 2 and 3, dollars.	Workmen's earnings per hr., Col. 4÷Col. 1.	Earnings per day, dollars.
10	3.00	0.00	3.00	.30	3.00
9	2.70	.15	2.85	.316	3.16
8	2.40	.30	2.70	.331	3.37
7	2.10	.45	2.55	.364	3.64
6	1.80	.60	2.40	.40	4.00
5	1.50	.75	2.25	.45	4.50
4	1.20	.90	2.10	.525	5.25
3	.90	1.05	1.95	.65	6.50

PREMIUM OF TWO-THIRDS.

1.	2.	3.	4.	5.	6.
Time con- sumed, hrs.	Wages per piece, dollars	Premium, dollars	Total cost work, Col. 2 +3, dollars	W'km'n's earnings per hr., Col. 4÷1, dollars	W'km'n's earnings per day, dollars
10	3.00	0.00	3.00	.30	3.00
9	2.70	.20	2.90	.322	3.22
8	2.40	.40	2.80	.35	3.50
7	2.10	.60	2.70	.386	4.33
6	1.80	.80	2.60	.433	5.00
5	1.50	1.00	2.50	.50	6.00
4	1.20	1.20	2.40	.60	7.66
3	.90	1.40	2.30	.766	...

It must be understood that we are not arguing against the workman's receiving six or seven or even twelve or fourteen dollars a day, in itself. If the laborer is so efficient that he earns these amounts, if the employer can get no other man or men who will do the same amount and quality of work for less money, the able employe will deserve and can demand these wages. But we have to consider the employer's side of the question, and to secure an adjustment of the wage that will be, as nearly as may be, satisfactory to both parties. From a practical, every-day business standpoint, this means that the employer has a right to secure results at the lowest reasonable price,—the lowest price, that is, that will pay the workman sufficiently to induce him to do his best.

Under the premium plan, remember, there is no compulsion. The workman will do his best when he is paid enough to induce him to do so; and when that amount is paid, he is satisfied. To pay more, is superfluous.

The employer who goes beyond the necessary point has a perfect right to do so, just as he has a right to give money to a beggar in the street or to contribute to the support of a needy family. In such cases, however, he is not entering into a business contract, but indulging in philanthropic activities. The case is similar to that of a man who wishes to have his barn painted. Ordinarily, he will pay what is necessary to get the work done. If he wishes to pay more, that is his own lookout; but the excess is philanthropy, not business. He may, of course, use the power of capital to force some starving working-

man to paint his barn for one-half or two-thirds the current rate, just as he may seize upon the needs of a body of workmen to force them to work for less than the average rate of wages of their class. Such a course is to be deprecated, as it represents neither justice to the men nor sound policy, in the long run, on the part of the employer.

Such instances are fortunately rather rare in this country. The current rate of wages for each grade of labor is fairly well fixed, and the average man will not work for a less recompense. Unfortunately, the average speed output in most occupations is also fairly well fixed, and at a low figure, owing to the almost universal inducement held out to the men to further their interests by soldiering on their work. The policy of the enlightened manufacturer is to pay the current rate of wages, plus an amount sufficient to induce the workmen to increase production to the maximum.

The size of the premium that it is best to pay will depend upon the nature of the work, the skill and intelligence of the men, and, to some extent, upon the amount of soldiering that has been done in the past. Here we have our schedule of additional pay for workmen doing their best, discussed in the previous chapter, to fall back on. If the additional work will not call for any special skill or severe bodily exertion, a premium of one-third should be sufficient. If it calls for no special skill or intelligence, but for a large amount of physical and manual labor, the premium should be one-half. If it calls for both intelligence and hard work, a premium of two-thirds, or even more, will be required.

If the establishment has been run at a high state of efficiency before the adoption of the plan, and the increase of output that may be expected is not considerable, a large premium will be necessary to induce the workmen to put on the extra steam. In a case of this kind, the premium plan is distinctly to be preferred to the time-guarantee plan, because the large premium will act as a direct and immediate stimulus without much danger of earnings so large as to be more than are necessary. If, on the contrary, the organization has been weak and inefficient, and the amount of soldiering is large, the amount of the premium should be small. Otherwise the workman will begin to earn excessive wages, and the employer will find himself paying more than is necessary. If the rate is not guaranteed, and the premium is large, the workmen will be afraid to take advantage of the higher wages offered, for fear of a cut, as in piece-work. Yet a low premium, which in most cases is the only one that will offer a satisfactory permanent solution of the problem of wages and efficiency, is usually slow in securing results, because the initial inducement appears to the workman to be small.

Another feature which causes the time-guarantee method to be often preferred to the premium plan, is to be found in the extreme simplicity of the former. It is obvious, from all that has been said, that the premium plan cannot be installed without careful thought and consideration. Every grade of labor, and every kind of work, will have to be carefully investigated before the proper amount of premium

can be decided. There are dangers to be apprehended from several sources, if a mistake is made.

It need not be pointed out that the employer cannot hope to secure results by constantly making experiments on the workmen in an effort to reach the proper adjustment ultimately. The essence of increased output from the labor force is larger pay to the men, coupled with an assurance that the increase in wage is permanent. Any shifting about of time base or premium is a fatal policy, whether the rate of pay be raised or lowered. It is not difficult to see that any lowering of the rates of pay will at once cost the management the confidence of the men in the new plan, and lead to all the unfortunate results of the policy of cutting ordinary piece-rates.

But how about raising the rates? Some one will say that it ought to be a shrewd and sound policy to err on the side of smallness of premium and lowness of time base at the start, and gradually increase in the amounts paid. This plan has two faults; it will secure little or no results in the beginning, and will secure bad results in the end. One of the faults of the premium system is that the inducement offered to increase the output appears small to the workman until he finds out, after long experience, just what he can do and just how much he can earn under it. If the premium is purposely made too small in the first place, this fault will be aggravated. The employer may have to put the premium up almost at once in order to get any results at all. If, now, the workman observes that the rates are being gradually raised, in order to bring them up to their maximum output, they will readily conclude that the

rates will continue to go up as long as they stay under the maximum. In other words, a temptation is offered to them to keep their output down as long as possible, so as to lead the employer to put on a high rate. In the end, he may be made to think that the "necessary" increase is very much higher than it actually would be with a fixed, unvarying schedule.

The policy of shifting rates, either up or down, is in itself a bad one. Change means insecurity; instability. The workman does not know where he stands now, nor what will happen to him next. Even if the changes are all apparently to his interest, he is liable to think that what can be revised upward can be easily revised downward. If the "policy of the house" is change, the changes upward under one superintendent may furnish a plausible pretext for changes downward under another. If the time base is arranged so that the workman can earn at least the average of his class, a low premium that is fixed is better than a higher one subject to constant variation.

The premium plan suffers some slight disadvantage as compared with the time-guarantee method, in that the former is more difficult for the workmen to comprehend. It stirs a man's imagination to reflect that if he does twice as much work he will get twice as much pay; but he will not so easily comprehend what it means to him to divide the gains from the time saved in the proportion of one-third to himself and two-thirds to his employers. Workmen are extremely suspicious also of anything complex or difficult to understand, because in too many cases they have emerged from twists and turns and intri-

cate pay systems to find themselves doing more work for less pay.

Similarly, from the employer's side, the greater complexity of the book-keeping and accounts necessary under the premium plan may make it less desirable than a simple time guarantee. The workmen's checks will all have to be changed, and a considerable increase in clerical work will be involved with the premium system. It might take some time after the plan was decided on to effect the necessary changes. In the meantime, the plant is losing money under the old, inefficient system. If the need for immediate results is imperative, the time-guarantee plan will be vastly better than nothing, to bridge over the period during which the more elaborate and more efficient arrangements are being made.

Another defect in the premium plan is said to lie in the fact that it imposes no penalty on the employe for not making good time. With ordinary piece-work, the penalty for slow work lies, of course, in the fact that the wages decline in exact proportion to the lack of skill or to the laziness of the workman. On the premium basis, the employe is guaranteed at least his usual wage, and as much more as he can earn by extra effort. If the time base is fairly set, and the premium is at all attractive, there will be no need of a penalty to induce the workman to come up to his usual output, and to exceed it, in order to increase his ordinary wage. In ordinary cases, therefore, this is not a fault to be considered as serious. The same fault is to be found in ordinary day work, where, of course, there is no direct or immediate penalty for slow work. In both cases there is an

indirect penalty, in that the poor or slovenly workman is in danger of discharge. In short, ordinarily the fact that the time limit is practically a guarantee of a day's wage under any reasonable circumstances, is a virtue rather than a fault; for it assures the workmen that the employer is acting in entire good faith.

There are cases, however, where the lack of incentive to come up to the time limit may cause the premium plan to fail. Suppose an employer knows that some of his workmen are soldiering regularly three or four hundred per cent. He decides to put in the premium plan; but he knows that if he uses the records that have regularly been made in the shop, the amount of output used as the basis of a day's work will be far below what it should be. He therefore makes the premium begin only, let us say, after the workman has done twice as much as before. That is, suppose that a piece of work can be done in four hours, and that the records of the factory for quite a period of time show this to be the lowest time required. The employer decides that the premium should begin only after the work has been done in two hours, or after four pieces have been done in an eight hour day. The workman may think that this is an impossible task, and refuse to "go after" the premium at all. Or he may know that it can be done in two hours, but may prefer to "take it easy," rather than try for a problematical premium that cannot be reached until after he has more than doubled his output. The plan will fail, because the incentive to greater effort is too small, and there is no penalty for not trying to secure the premium.

What is needed in this case, is ability on the part of the employer to demonstrate conclusively that the work can be done in less than two hours. With this may be coupled some method of inducing the workmen to make the best time; this may be either in the form of a differential rate (to be described later), or in some definite penalty in case of failure. This case illustrates the fact that there is danger of making the premium plan so unattractive as to bring no results.

The defects in the premium plan that have hitherto been discussed partake, on the whole, of the nature of dangers that should be avoided when it is applied in particular instances. It has one fault, however, that is fundamental in its nature,—a fault that we have observed in day work and piece-work of all kinds. That is, the temptation which it offers to the workmen to conceal the length of time it takes to do new work. Under the premium plan, and on the time guarantee, systematic soldiering may be done away with only after the rates have been fixed and are not liable to be changed. Under both piece rates and day work, the temptation to soldier on new jobs is strong, in order to avoid making a high record which will have to be adhered to, and to secure a large price on the job. Under the premium plan this temptation is perhaps even stronger, for the reason that the larger the time base, the greater is the premium when the work is afterward done in the shortest time. This can best be illustrated by a concrete example, given by Dr. Taylor in the paper before mentioned:

“Suppose that two men are at work by the day,

and receive the same pay, say 20 cents per hour; Smart and Honest. Each of these men is given a new piece of work, which could be done in one hour. Smart does his job in four hours (and it is by no means unusual for men to soldier to this extent). Honest does his in one and one-half hours.

“Now, when these two jobs start on this basis under the Towne-Halsey plan, and are ultimately done in one hour each, Smart receives for his job 20 cents per hour, plus a premium of $60/3=20$ cents,—a total of 40 cents. Honest receives for his job 20 cents per hour, plus a premium of $10/3=3\frac{1}{3}$ cents, a total of $23\frac{1}{3}$ cents.”

Assuming that most kinds of work can be done in an amount of time that is fairly well fixed (though this rule, as we have seen, is by no means universal), the practice of basing payments on previous records in this way, not only puts a premium on dishonesty and deceit, but works a grave injustice on the workmen. If two jobs can be done in the same time, justice and fair dealing demand that they should be paid for at the same rate, as a starting point. Then the amount of premium earned will depend directly on the individual efforts of the workmen. But when the time base is taken from previous records in the manner above described, a man's earnings will depend not so much upon his individual exertion and skill as upon the amount of soldiering that was done upon the work before the premium plan was started. Some records will be made by first-class men working at near to maximum speed. Any premiums earned on this kind of work will come only as a result of extraordinary effort and skill and intelligence.

Other records in the same shop and on the same kind of work will be made by an indifferent workman trying to make a ten-minute job look as if half an hour were required to finish it. In this case a good-sized premium can be earned without any special effort. The temptation to soldier on new work under the premium plan will therefore be even stronger than with ordinary piece rates. With piece rates, under the usual conditions, all that the men can gain from soldiering is the privilege of earning their usual wages with as little effort as possible, since they know that the rates will be cut if they try to make any extra money out of the system. Under the premium plan, however, soldiering actually means more money in their pockets.

The disadvantages arising from making rates based on previous records, are therefore two: First, there is the greater cost to the employer in all cases where there has been considerable soldiering in the making of the previous records. The time basis being too high, the workmen, when they begin to treble or quadruple their output, will earn half as much again as it would really be necessary to pay in order to get the work done. This not only is expensive, but it furnishes the employer a strong temptation to take matters into his own hands and cut the rates, regardless of consequences. Employers and managers are only human, after all; and the immediate saving of a few dollars on a definite piece of work makes a much stronger impression on their minds than the loss that would come indirectly from concealed restriction of output. The loss of confidence that even a single cut in the rates made because

of high earnings, would bring, might be sufficient to cause a whole body of men to give up all attempts to increase their wages through the premium plan. The employer must make up his mind not to recoup himself for any excessive earnings by cutting rates, for the sake of the far greater but less apparent benefits accruing from sticking to the principle of unchangeable rates.

The second disadvantage of making rates based on previous records is the effect on the men of the inequality involved. As the employer has no means of knowing which records have been made at nearly maximum speed and which are the result of a large admixture of soldiering, some men are liable to be at jobs on which they make premiums only with great difficulty, while others will find it easy to add to their usual wages. The injustice thus brought about is bound to influence the workmen, so that some of them may refuse to go after the premiums at all. Of course, it is not always, nor perhaps even generally, true, that the amount of soldiering in the records of work of the same grade will vary so widely as to work serious injustice. Where this is the case, however, the premium plan will be slow and irregular in its operation in reducing costs.

The answer to these difficulties is obvious enough. We find ourselves again confronted by the desirability of an accurate scientific study of the minimum time required to do each job. Once that is determined, the tendency to drag out the time on new work is removed, and a premium with a fair and just time base will provide equal opportunities for all to increase their earnings.

Nothing has been said, so far, in regard to the possibility of combining the time-guarantee with the premium plan. It has been made fairly clear that the premium plan cannot hope to succeed if any shifting of the rates is attempted; hence it may be assumed that a guarantee not to cut rates will have to accompany this system. In fact, one of the advantages of the premium system lies in the smaller temptation which it offers to employers to reduce the rates, since the direct gains from increased output are divided between employer and employe.

Nevertheless, we have seen that from various causes the premium plan may result in larger earnings than the employer would find it necessary to pay some one else to do the work. It may be necessary to offer at first a much larger premium than would ultimately bring the desired results, after the men have learned just how much they can do when they exert themselves. Some rates may be excessive, because based on records carefully nursed to exhibit a much longer time on work than is actually required. After a time, the employer will naturally desire to cut excessive earnings down to a reasonable increase over average wages, and to change the time bases on difficult jobs, so that those who are earning too little will be given enough stimulus to induce them to do their best, and those who are earning far more than their fellows through no effort or skill of their own will have an equal opportunity with other laborers of their class. In some cases, when the rates prove satisfactory, no changes will be necessary. In others, inequality and unsatisfactory conditions will arise. It is well, then, to have a

definite understanding that, at the end of a certain period of time, a readjustment will be made.

Other conditions being equal, the time guarantee with the premium plan should be longer than with the straight piece-work system, and the readjustment, when made, should embrace as few changes as possible. Only the glaring inequalities should be leveled off, and the really excessive rates cut down. This is due to the fact that the premium plan automatically cuts the rates anyway, as the output increases, so that the workmen are prone to feel that the automatic cuts are enough, without an arbitrary reduction by the employer. With the time guarantee on piece work, the men who have raised their wages three or four hundred per cent will be ready enough to admit that they are being paid too highly, and will submit gracefully to a readjustment that allows them to earn sufficiently more than the average of their class to induce them to work at high speed. With the premium plan, the inequalities and excessive earnings will not be nearly so obvious, and the employer must exercise correspondingly greater caution in making changes. The success of the premium plan depends so vitally on a policy of no change in rates, and on encouraging the men to earn as much as they can, that only the most necessary readjustment should be made.

This part of our subject calls for a consideration of the results secured by the adoption of the premium plan. The data are rather difficult to secure, because of the varying conditions before and after the adoption of the plan. A certain switchboard manufacturing company has a number of men working at

small machines which used to turn out products at an average rate of one every half hour. The men were paid 30 cents an hour, making the labor cost of each piece 15 cents. The premium plan was installed, allowing the men a premium of one-half of the time saved. Within a week, the pieces were being turned out at the rate of one every eighteen minutes. The premium is easy to compute. The time base was thirty minutes, and the rate 30 cents an hour. Twelve minutes was saved on each piece, or one-fifth of an hour. The total saving was one-fifth of 30 cents, or 6 cents, of which the workmen received 3 cents on each piece. The pay of the workmen is then 30 cents an hour plus 3 cents for every eighteen minutes. At 30 cents an hour, eighteen minutes amount to 9 cents. Add 3 cents premium, and the labor cost is 12 cents per piece. As the workman earns 12 cents every eighteen minutes, he is paid $\frac{2}{3}$ cent a minute, or 40 cents an hour. The saving to the manufacturer on 500 pieces is revealed in the following table:

	Day work	Premium $\frac{1}{2}$ of time saved
Number of pieces.....	500	500
Time on each, minutes.....	30	18
Total hours.....	250	150
Rate per hour, cents.....	30	40
Labor cost, per piece, cents.....	15	12
Total labor cost.....	\$ 75.00	\$60.00
Add for overhead charges, 20c an hour.....	50.00	30.00
Total cost.....	125.00	90.00

The saving in labor cost is seen to be 20 per cent, the total saving 28 per cent, as the time is reduced 100 hours on 500 pieces. The premium in this case was a rather large one, hence the increase in wages was considerable, $33\frac{1}{3}$ per cent.

The table exhibits another peculiar feature that

almost always accompanies any practical attempt to apply the premium system. As may easily be surmised, the premium in the above case was too large,—that is, larger than will be necessary when the time is further reduced, as seems highly probable; for in the short space of a little over a week the time was reduced two-fifths. In this case, as in many others, the shop was considered to be in a highly efficient state, the time on the products was supposed by the workmen, foremen and managers, to be down to the minimum, and it was thought that it would be idle to apply the premium plan. When tried, therefore, the premium was made fairly large, in order to give it a chance to secure any results at all. Many a manufacturer, when he hears about various plans to secure a larger output from his working force by a rearrangement of his system of paying wages, is strongly inclined to think that his plant is working at its maximum capacity; that his laborers are all highly paid, first-class men, who are working at top speed; and that any plan that proposes to pay them more, in order to secure a larger output per man, may work well somewhere else, but will fail in his particular establishment. Yet thousands of instances have proved conclusively that no man knows what can be done under an incentive, until it has been tried.

The words of Mr. Halsey in regard to the specific application of his plan are significant. He was shown a table of costs by a manufacturing company which exhibits “the results on certain parts which had been reduced to a strictly manufacturing basis. They had been made over and over again * * * and the

lots were of the same size in both columns of the exhibit. * * * Both workmen and foremen were positive that the time on these parts was down to the minimum, and that it was useless to apply the minimum plan to them. Nevertheless, the prices for which the figures were given showed an average reduction in time of 41 per cent.

"Another exhibit of considerable magnitude was applied by an electrical manufacturing company, the average results shown being a reduction in time of 39 per cent, a reduction in labor cost of 28 per cent, and an increase in wages per day of 23 per cent.

"These gains are so large as to excite incredulity. Most men of experience will not seriously consider a system which proposes to increase output by 70 per cent while decreasing wage costs and increasing daily wages by 25 per cent; and I am satisfied that if the plan did about half as well as it really does, its growth would be much more rapid than it is."

Another system of paying labor deserves a brief mention,—namely, the contract plan. In a sense it is a combination of piece work and day work. Under this plan, a foreman or competent workman contracts with the employer to turn out a certain amount of work for a certain price. The contractor engages the men, and arranges their rates of pay himself, this pay being by the day. The men have no interest in the contracts, and draw their wages, as usual, from the employer. The wages are charged against the prices agreed in the contract; and as the work is turned in, the contractors are paid the contract price minus the wages paid out.

The merits and demerits of this plan can be conveniently considered from two viewpoints: that of the employer, and that of the employe. To the employer, it is practically piece work; to the employe, it is simple day's work, under the supervision of an unusually energetic and sharp-eyed foreman. The workmen may not even know that the work is done on a piece-price basis, unless he learns accidentally that it is being done under contract.

The success of the plan, from the point of view of rapid and efficient production at low cost, will vary with the number of men employed by the contractor, and with the variety of the work. The contractor, under spur of financial necessity, usually makes so close a study of the time in which work can be done, and supervises the men so carefully, that soldiering becomes difficult. Some contractors teach laborers and lower-priced men to do the work ordinarily done by mechanics. If the number of men under one contractor is large, the supervision usually cannot be so close, and the discipline that is necessary to a maximum output is liable to relax. The contractors are usually foremen or skilled workmen, who are intimately acquainted with the conditions under which the work is performed. For this reason, they can secure nearly a maximum output so long as the work covered by the contract is confined to the few operations with which they are most familiar. If the work is more varied, it is liable to extend beyond their special field, the close discipline relaxes at certain points, and the cost of production mounts up.

From the employer's point of view, the contract plan has certain disadvantages. In the first place,

since the machinery and plant are furnished by the employer, the contractor is liable to sacrifice everything to a larger output. The tools and equipment deteriorate rapidly, because the contractor will use any tool or machine to the breaking point rather than spend the time and effort necessary to repair and otherwise care for the auxiliary capital. The employer should, and in the best establishments does, provide special men to grind tools and care for the machinery; and in the contract, certain clear-cut provisions for grinding tools at certain intervals, and so on, will usually prevent a considerable loss from this source.

Second, the contractor himself is liable to be under the same temptation to soldiering as the ordinary piece worker. If the profits which he makes on one contract appear too large, he knows that the employer will cut the rate on the next one. Since this means that he will not be allowed to make more than a certain amount of profit in any case, he would rather make that amount with as little trouble to himself as possible. While he may not definitely try to restrict the output of his men, he is liable to give himself no concern as to their efficient management or to improvements in methods or processes, lest the price secured for the next contract be lowered. It is not unusual for a contractor to refuse to adopt improvements in machines, methods, or processes, because he knows that his next contract price will be reduced in direct proportion to the profits which he has made, and the improvements introduced; and he will have to undergo all the

trouble and stress of changed conditions of work, without any increase in his remuneration.

There are ways by which these difficulties may be avoided. In many cases, there is more than one man who would be both capable and desirous of taking on a contract and putting it through. The contract may then be awarded to the lowest bidder. It is not always wise, of course, to keep changing contractors; but the fact that there are other men ready and willing to step into the place, will often prevent soldiering on the part of the man who is holding the position. Care should be exercised in following this plan, lest the competition become too keen. A bid may be offered so low that the contractor will lose money on it, and both the shop and the system becomes disorganized. Too close competition with regard to prices bid is liable to lead to a policy of driving the men beyond their powers of endurance or sense of justice, followed by disagreeable, not to say costly, labor troubles.

The difficulty of inducing contractors to introduce improvements in machinery, methods, and processes may be obviated by an admixture of common sense into the management. The contractor should be allowed to share in the benefits of any improvements that are made. For instance, he may be promised that the next contract price will not be cut, and that for those following he will be allowed to make his ordinary profits plus one-half or one-third of the amount saved by the new method. In fact, after a few contracts have been made, and if possible farmed out to the lowest bidder, so that the minimum contract price has been determined, it is often advisable

to make the contractor's profits depend on the savings in cost of production which he has effected. For this purpose, wear and tear on the machinery, as well as wages paid, may be computed to make up the total, which would do away with the deterioration of equipment which forms so serious an objection to the system as ordinarily applied. The workings of such a plan, in an assumed case, might be as follows:

Suppose that a contract price of \$1.00 a piece is arranged, and that four thousand pieces are made, with a total expense account as shown in the table.

Pay of laborers	\$3,000
Contract price	4,000
Expense of machines.....	2,000
4,000 pieces cost.....	\$6,000
Cost per piece.....	\$1.50
Contractor's profit.....	\$1,000, or 25 cents per piece

Now, suppose that the contract price is based on \$1.00 a piece, plus one-third of the amount saved over previous costs of production, machinery up-keep being computed, as well as wages. The contractor now makes 5,000 pieces at the same cost for labor, and takes proper care of the machinery.

Pay of laborers.....	\$3,000.00
Contract base piece.....	4,000.00
Machine expense.....	1,000.00
5,000 pieces cost (per piece, \$1.00).....	\$5,000.00
Saved, per piece.....	.50
On 5,000 pieces.....	\$2,500.00
Of this amount saved, one-third goes to the contractor....	\$ 833.33
Two-thirds to the employer.....	1,666.66

Considered from the point of view of the employe, the contract plan assumes widely different aspects, according to the treatment accorded them

by the contractor. Ordinarily, the workmen would seem to have little to gain under this system. Their contractor-foreman is anxious to turn out the largest possible amount at the lowest cost, and his familiarity with the work, and the close supervision which he exercises make them work harder than usual without an increase in pay. Yet in shops where the contract plan has proved most successful, the position of the laborers is as good as, if not better than, in establishments under ordinary management. The foreman knows the work and its conditions; better still, he knows the men personally, and often he is acquainted with all their little trials and difficulties. They know him as a friend who sympathizes with them, and who will help them when in trouble. They will gladly do more and better work for friendship's sake than they would for an impersonal employer, who is felt to be an antagonist intent on forcing down wages at every opportunity.

Where these conditions do not obtain, of course, the ignorance and inexperience of the contractor in handling men frequently causes the employes to be unjustly treated. But the contract system at its best seems to provide conditions under which the relations between employers and men are much more agreeable and normal than under ordinary piece work or day work, and it is to be deplored that the benefits of the system are not more widespread.

CHAPTER XIV.

EFFICIENCY AND WAGES; THE STUDY OF UNIT TIMES.

The various methods that have been discussed in the foregoing chapters for stimulating production by the wage system have been in the main extremely practical in their nature and immediately applicable to existing conditions. In many cases, stress has been laid on the fact that the method described could not be considered the best or most scientific permanent solution of the problem, but had the advantage of bringing quick relief to diseased conditions in business organization. They were, in fact, in the nature of "first aids to the injured." If a man has met with an accident in a place far removed from expert medical assistance, it is often not advisable to wait until he can be given the best possible treatment, but to fix him up as well as circumstances will permit, so that he will not die on the way to the doctor's office. If an artery has been severed, immediate measures to stop the flow of blood, even if the methods be crude, are better than the most scientific surgical treatment applied after the patient is beyond hope of recovery. So an establishment that is suffering from a bad leakage of profits may find it best to apply an immediate remedy that will as far as possible check the losses

for the present, while measures are under way that will ultimately heal up the wounds.

The fundamental weakness that has appeared in all previously discussed systems of paying wages we found to lie in the fact that the employer or management had not accurate dependable data as to the minimum time in which work could be done. In the absence of such data the only basis on which wage payments, piece rates and premiums can be computed is the average of previous records made by the workmen themselves. We have already seen how faulty these records are, due to the interest of the workmen in concealing the time in which work can be done, and to the unconscious tendency of men in all walks of life to take as slow and easy a gait as possible, unless working under a strong incentive to exert themselves. Previous records then at the best represent only a very rough approximation to the minimum in which a job can be done, and at the worst may be several hundred per cent off the mark. The worst of it is, that the employer has no means of telling which records are good and which are bad, and consequently does not know how much needless expense he is burdening himself with, nor how great an injustice he is doing his men, when he uses the previous times as a basis for a pay system.

The disadvantages of not having an accurate scientific minimum time for each job are almost innumerable. Similarly the advantages of having such a minimum standard time are difficult to count or measure. In the chapters dealing with the standardization of machine operations this subject was considered with reference to the possibilities of econo-

mies in the details of production where machine work is involved. We have now to consider the question in its relation to work of all kinds, and from a somewhat different point of view. The problem before us now is that of methods of so handling the workmen and arranging the system of paying wages that they will be induced to work at maximum speed (consistent with good health and good workmanship), without paying more than is wise or necessary or proper to secure this result.

It is difficult to select words that will not be capable of misinterpretation. Those who have followed the line of reasoning in the preceding chapters will understand that by "inducing the workmen to work at maximum speed" we do not mean that the employer should take advantage of a laborer's weak economic and financial condition to drive him or even to compel him to work harder than he wants to. What is meant is that he should be offered sufficient rewards, in the shape of higher pay or prospect of promotion tendered in good faith, to make him willing and even glad to do his best. There are, it is true, some men who are natural loafers, who will do slovenly work no matter what inducements are held out to them to mend their ways, and who seem to be influenced by no motives of ambition or hope of bettering their condition; but men of this type are fortunately rare. It is an inexorable law of nature that the incompetents are weeded out and only the capable and efficient survive. Nature has the right to keep only the best. The employer similarly has the right to fill up his labor force with the best men he can get. The employee who cannot or will not do a reasonable

amount of satisfactory work has no right to expect that his employer will keep on paying him money for labor that he could get efficiently and ably performed by someone else. More than that, the employe who will not accept an increase of fifty or a hundred per cent in his pay to increase his output to an extent that the experience of others has shown to be reasonable, has no right to keep from this job some other man who would be glad to improve the opportunity offered to earn high wages. If the standard set by the employer is reasonable, and the inducements to attain this standard are such as would cause an average man, without any undue compulsion, to do his best, this standard may justly be demanded of all. The weak, the incompetent, above all the deliberate drones, after they have been given an equal opportunity with the rest, have no further claim on the employer.

The feature of not paying for additional effort more than is wise or necessary or proper ought to be well understood by those who have followed the argument thus far, but to the careless or prejudiced reader is capable of misinterpretation. The employer generally understands by this that he should not pay a man more for his work than he could get another man to do it for, and the workman knows that this is the principle on which his wages are usually gauged. There is a fairly fixed rate of wages for each grade of labor, and the workman knows that if he succeeds in earning at piece rates much more than this amount, the employer can and will get another man to take his place and do his work at lower wages. Since, as we have so frequently pointed out, this system leads

to soldiering and high labor cost, the workman must be paid more than the average rate of wages of his class. Only the driving, unjust employer can expect to get a more than average output from his men without paying more than the average wage. But if more than the usual rate must be paid, the question of **how much more** remains to be decided. This question brings with it another, much more difficult to answer, namely, how can the maximum output be secured and the wages be adjusted so that each man will receive just that amount that will make him contented to do his best, no more and no less.

It is, of course, possible to secure a maximum output by paying excessive wages; but that is not wise or necessary or proper. The man who is soldiering four hundred per cent on piece-work will bring his production up to the standard if he knows positively that the rate will not be cut, but in that case his work will be costing the employer two or three times what would be necessary. The man would be content to do the same amount for a permanent guaranteed increase, say of sixty per cent over his present wage. The disadvantages of the systems we have been considering have consisted mostly in the fact that while they will secure the desired increase in the output either immediately or ultimately, they involve paying for a greater or less period of time what may be called excessive wages, necessitating ultimately a readjustment of rates with all its attendant dangers.

Let us turn back over the preceding pages and consider what disadvantages have arisen in the application of the systems of paying wages that have been considered, because the management has not been in

possession of the scientific minimum standard time for each piece of work.

1. In the first place, there has been the motive for deliberate systematic soldiering. Even without any time-guarantee or premium plan or other extraordinary system of pay, any device by which the employer actually knows beyond any possibility of doubt just how long it takes to do a job will eliminate at once a large margin of loss from concealed but deliberate marking time. If it does nothing else it sets a mark towards which the man who takes a pride in the efficiency of his work will strive, since he knows that he is not giving any trade secrets away by attaining the goal. In the case of the men who were soldering wires to switchboard pieces, described in a previous chapter, we saw how effective was the fourteen minute standard time for the work. The men knew that the work could be done in fourteen minutes. As their records were turned in, the question uppermost in their minds was not "How much extra effort have I been able to save myself?" but "Am I a first class workman or not?" It is true that in the instance mentioned the question of whether a man had reached the point of being a first class workman was coupled with the prospect of promotion and higher pay, but it is noteworthy that there was not a man in the department who felt that he had any interest to further by taking longer time to do the work than was absolutely necessary.

Take another case, that of the insulation of small coils. The work could be done in six minutes, but for years bore a piece-rate arranged on the basis of half an hour for the job. Since no records were ever

turned in that clipped many minutes off the half hour basis, neither the foreman nor the management had any idea that the rate was too high. If there had been an accurate time study made of the operations on this work, it would have been impossible for the men to soldier five hundred per cent regularly on the insulating task. Even if the work had been paid for by the day; even if there were no incentive to make a good showing; and even though the supervision were careless and ineffective, no workman would dare to turn in thirty minutes' time on a job that was generally known to be possible of execution in six minutes.

It is not maintained that the mere knowledge of the minimum time on piece work jobs will be of itself sufficient to induce the workmen to strive toward the maximum output. In fact, if a piece-rate system were made out on a basis that would allow the men to make only average wages in the event of their attaining the maximum, widespread and justifiable dissatisfaction would inevitably ensue. But a knowledge of minimum time does have this advantage, that it takes away the motive for systematic and deliberate soldiering, that is, the interest of the workman in concealing the length of time it requires to do a piece of work. If the standard time is already well known to the foremen, there is nothing to conceal.

2. As with systematic soldiering, so too with unconscious or natural soldiering. This arises from the fact that it is a natural tendency to exert no more effort than the necessities of any given situation require. When nobody knows definitely just how much time must be put into any given piece of work,

no man feels that he can be censured for drifting along at his ease provided he does not sit down to read the paper while at his work, and provided he does not turn in a record inexcusably inferior to previous showings. But if there is a standard time by which his own record will be compared, he will keep the minimum time in his mind, and even if he makes no conscious attempt to equal it, he will unconsciously waste less time than he would if anything is accepted unquestioned. Given a motive to turn out the maximum output under a scientific system of pay, and the unconscious soldiering will disappear entirely.

3. Another type of unconscious soldiering has been discussed in the chapter on standard times for machine operations. This arises from the fact that very few, even of the best workmen, know the conditions necessary to secure the best results. The establishment that takes up the study of the standard time on work will naturally give consideration to the matter of finding out better methods, better processes, better tools and the like. In this way the time may be reduced below what would be possible to the most skilled and industrious workman, and result in tremendous savings in cost of production. All that has been said in regard to machine operations and in regard to the saving of wasted time applies here, and need not be further discussed.

4. In our consideration of the premium plan we came across a number of instances where a lack of statistics covering the time in which work could be done made the plan faulty or ineffectual. Perhaps the most marked of these related to the smallness of

the initial inducement which the premium plan offered to the workman, giving rise to very slow results when the plan is inaugurated. Suppose a man earns thirty cents an hour and has long taken five hours to do a certain piece of work. On a premium of one-third of the time saved, he will receive only five cents for cutting half an hour off his previous record. The man has been unconsciously soldiering a hundred per cent or more on his work—and experience shows this to be a small percentage—but he does not know that. He will think at first that to cut off even half an hour will require extraordinary effort on his part. Probably, therefore, he will not try for the premium at all. After a long period of time he or some of his fellow-workmen will discover that it is possible after all to clip half an hour from the record without undue exertion, and he begins half contemptuously to try for the extra five or ten cents a day. It may take months before he gets his eyes opened to the fact that the work can be done in two hours and a half or less, and that the premium is capable of paying him a dollar a day in additional wages. At first he does not see that in saving so much time he not only makes, in the case assumed, a premium of twenty-five cents on each piece, but turns out four pieces instead of two, on each of which he earns his premium. Nor can the management that has made no attempt to determine the minimum time on this work spur the men to greater effort by pointing out at the beginning just what the premium will do for them. Months must therefore be wasted while the workmen are slowly learning for themselves what they can do and what they can earn. In

many cases the premium which would really yield a large return in the end may appear so unattractive at the first that the workmen will scorn to rise to such uninviting bait at all, and the plan will fail utterly.

With the standard time determined beforehand, all this trouble may be avoided. The foreman can say to the workman: "This job can be done in two and a half hours instead of five. You can do it in that time. When you have done so, you will get a premium of twenty-five cents on each piece, and by doing four pieces instead of two will add a dollar a day to your wages." If he is the right kind of a foreman he will pitch in and do the work himself in two hours and a half. At any rate, the speed boss or tester can demonstrate before the unbelievers that the extra dollar a day is in plain sight of all who wish to try for it. The men will then make determined efforts to increase their output from the very start, knowing that they are within reach of a real and highly desirable increase in their wages.

It is because the advantages of the premium plan are not evident in the beginning that so many manufacturers have, as Mr. Halsey observes, made the premium too large. A premium of one-half or two-thirds, that does not appear to promise much in the beginning, is liable to result in much higher wages than are necessary or proper, and thus tempt the employer to cut the time base. As we have seen, however, the premium plan, once started, is a dangerous thing to tamper with. As it automatically cuts the piece rate when production increases, the workmen will view with extreme suspicion any

attempt to reduce the rate arbitrarily. A premium which will be satisfactory to employer and employe in the long run if the management can point out that it will ultimately increase wages thirty to one hundred per cent, will bring better results from the start than a high premium which the workmen do not understand, and which in the end will mean wages higher than are necessary or proper.

5. Another fault of the premium plan with a time base calculated from previous records is the injustice and unfairness that will arise from the fact that the amount of soldiering in the previous records does not represent a constant factor. We remember in the illustration of the two men who were given new work which could be done in one hour that one man finished his job in four hours and the other in an hour and a half. When these two jobs were put on a premium basis the man who soldiered most earned 40 cents and the man who was honest earned $23\frac{1}{3}$ cents. In the absence of statistics as to the minimum time for all jobs the premium plan must inevitably result in allowing some workmen to earn very large wages, while others, in which previous records have been made by first-class men working at high speed, will find it impossible to earn enough to make it worth while for them to go after the premium. Not only does this prevent numbers of the workmen from increasing their output, but it fosters a feeling among the men that the employer is not giving all of them a "square deal." Even if all of them are earning a least a fair day's wage, it is not in human nature to see some men given an opportunity to double their wages while others must work

just as hard for the same old pay, without a feeling that injustice has been done. And on new work the temptation to soldier under the premium plan is even stronger than under ordinary piece work, because in the first case it means additional money wages, while in the second it only means the privilege of doing the work in ease and comfort. Here we meet again the advantage which comes from taking away all motive for deliberately concealing the time in which work can be done.

In connection with the unfairness that arises from basing the premium plan on workmen's records we should consider the confusion that will ensue in the management of the men. Since the employer or foremen do not know which work has been done close to minimum time and which contained a large element of soldiering they will be at a loss to understand just why some men are increasing their output and earning large premiums and why some are not. The man who is doing well may win undue commendation from his employer on the ground that he is an especially skillful and energetic workman, when as a matter of fact his premium has been based on a record made with an excessive amount of soldiering. Likewise the man who is earning little more than formerly may or may not be liable to censure. He may be lazy and lacking in ambition, or the time base on his work may be so arranged that there is little chance for him to earn a premium. Confusion in this respect is liable to lead to further injustice to the workmen and to utter failure of the plan. Where a large number of men are engaged in the same kind of work,

however, it is generally easy to determine who are the workers and who are the drones.

6. It is perhaps not necessary to make a special point of the value of having a definite goal before the eyes of the workmen, since that has already been touched upon. Yet it is not only necessary that the workmen should realize that the management knows the quickest time in which a job can be done, but this quickest time should be constantly brought to their attention as a mark at which they should aim and as a mark which the management will expect them to hit. On all instruction cards and time cards which the men have to read and fill out there should be placed in plain sight the standard time for the job that is under way. This will not be effectual, of course, unless there is some incentive to the workman to reach this standard time, and as we shall see, in some cases there may even be a penalty attached for not making it. It is obvious, however, that even the dullest will feel no temptation to soldier deliberately when they see that the management know accurately how fast the work can be done. If no determination of the standard time has been made, the men will have no definite mark to aim at, and all the incentive from this cause will be lacking.

We come now to a consideration of the methods to be employed in finding out just how much work a first-class man can do in a day, or stated in other terms, just how long it takes to do a certain piece of work. This requires a study of unit times, so-called, invented by Dr. Taylor and later applied by him and by several others.

The method, in brief, is as follows: To find out

how quickly work can be done, a first-class man must be timed with a stop-watch while he is working fast. The only way in which the timing can be done with certainty is to divide the man's work into its smallest elements, and time each element separately—hence the term, unit times. For instance, in the case of a man excavating clay with a wheelbarrow, the elements should be: Filling barrow with clay, time in hundredths of a minute. Laying down shovel and picking up handles of wheelbarrow, time in hundredths of a minute. Wheeling barrow up incline, time per foot walked, or time for walking, say, twenty feet. Wheeling barrow on level, time per foot walked. Time for dumping and turning, in hundredths of a minute. Returning empty, times on level and down incline. Dropping barrow and picking up shovel, time in hundredths of a minute. When all these have been added up, and accidental delays have been eliminated, the absolute minimum time for the work will have been found.

This simple illustration does not, of course, furnish an entire solution of the problem, nor will a single observation be sufficient to give practical and usable results. A number of observations should be taken on different first-class men, at different times and under different conditions, and these should be averaged.

A most difficult matter to decide is the amount of time in gross that must be allowed for rest, and for accidental and unavoidable delays. This can be determined by taking the gross amount of work performed in a day and comparing it with the times made on the individual operations. If, in addition,

the times for rest and for accidental or unavoidable delays are entered on the record along with the actual work operations, these elements can be studied with about the same accuracy as the others.

One of the greatest difficulties in this kind of study is to be found in the fact that no two men work at exactly the same rate of speed. Even on the simplest and most ordinary of day labor some men will have a "knack" of getting through a certain amount of work with considerably less expenditure of time and effort than others. When the work requires special skill and intelligence, the variation between the times taken by different men becomes so important as almost to defy analysis. This factor we have already touched upon in considering standard times for machining, where a large amount of manual dexterity and skill is involved, as in assembling work. The principle to apply in a case of this kind is to divide the necessary work into its simplest elements and give each man as few operations to perform as possible. This serves a double purpose in shortening the time required. By increasing the division of labor each man becomes more skilled in devoting his attention to two or three operations than when he must divide his time among twelve or fifteen. Also by reducing the number of operations in the work of each man the complexity of the study of unit times is decreased and the standard minimum is more easily determined. In general, the best policy is to take the time of a first-class man when working at his best. When this is secured it is not a difficult matter to determine how far short of this amount an average man can do.

Where the work is simple and requires little skill, there will not be a great amount of variation between the shortest times of a number of men, both average and first-class. In this case the standard time to which the workmen will be expected to attain may be set close to the maximum of a first-class man. But as the work increases in complexity and calls for a greater display of skill and dexterity, the record of a first-class man is in danger of being so low that the average workman cannot hope to reach it. The standard to set in a case of this kind may vary considerably with different conditions. If all or most of the workmen engaged in this kind of work are skilled and trained, the standard can be put close to the maximum. If the contrary is true, there must be considerable allowance made; and this rule will also apply where the work is new.

Theoretically the best policy is to set the highest standard, discharge those who cannot obtain it, and fill the labor force with the best men only. This is not always possible. The conditions of the work or of the labor market may not be such that it is practicable or possible to employ only first-class men. Then again, in the case of labor that is strongly organized there will invariably be vigorous opposition to a plan that sets a difficult task that must be performed at the risk of summary discharge. Where these conditions prevail, it is usually the best policy to set a standard that first-class men can attain and arrange a bonus plan of payment that will give extra rewards to those who perform their task without inflicting any deliberate penalty on those who fail.

The proper division of work into its elements

will call for considerable skill and judgment, and will be determined in most instances by the conditions and nature of the work. The minuteness of the divisions should vary according as the work is standard,—that is, to be repeated over and over again, or is of a special nature. If the task that is being timed is one that will be repeated over and over, or is one of a series of jobs that form part of the regular work of the establishment, the division into elements should be as minute as possible.

It seems at first glance absurd to carry the subdivision of elements to a point where none of them takes more than five or six seconds to perform. Yet as a matter of fact, the finer the subdivisions, the more accurate will be the results. It is easily seen that the study of single small operations is simpler and more likely to be successful than when a large and complex operation is studied as a whole. The large and complex operation gives greater opportunities for interruptions or accidents to creep in, thus rendering the results obtained inaccurate and unreliable.

Of course there are some kinds of work that are not liable to be repeated many times. When this is the case the necessity for extreme accuracy is not so pressing, and several elementary units can be grouped together and studied as a whole.

Perhaps the most extensive study of unit times has been made by Mr. Sanford E. Thompson in connection with all kinds of work in the building trades. His results are partly described by Dr. Taylor in the paper on Shop Management. The form giving the results of time-study on excavation work is that

used by Mr. Thompson and given in the aforesaid paper. It contains spaces for a description of the work, for recording the times on elementary operations in detail, for recording the total time of complete operations, including necessary delays and so forth, and blanks for setting down the elementary units into which any piece of work may be divided.

In the table shown observations were recorded on two similar operations, the times on which were slightly different—excavating sand and clay. The time for the elements in each of these is the same except for the fact that clay has to be picked apart and is more difficult to load. One advantage of the minute subdivision into elements consists in the fact that observations on either of these operations will do for the other, except for the loading. The table, as will be seen, is not fully filled out, enough items being given to show the method pursued.

The scientific determination of the amount of work a man can do is not limited to a mere time study of the elements of a job when done by a first-class workman at high speed. We saw in the chapter on standard times for machining that in the case of certain kinds of work the time could be materially shortened by extended experiments to determine which tools and appliances would give the best results, which speeds and cuts and power, and other conditions of work. In work of that kind an instruction card was necessary. With simpler kinds of labor, such as excavation with pick, shovel and wheelbarrow, or loading billets with the hands alone, there is no need of instruction cards to tell the manner and the order in which operations should be performed.

STUDY OF UNIT TIMES ON WHEELBARROW EXCAVATIONS.

OPERATIONS: WHEELBARROW EXCAVATION		Op.	Time	No. Shov.	Op.	Time	Av.	No. Shov.	Op.	Time	Av.	No. Shov.
Department:	Construction	a	1.37	15	a	1.12	1.12	12	a	1.36	....	11
Men:	Mike Flaherty.....	b	1.56	....	b	1.39	0.27	....	b	1.81	....	13
		c	1.82	....	c	1.58	0.19	....	c	2.14	....	16
Materials:	Sand requiring no pick..	d	1.97	....	d	1.70	0.12	....	d	1.98	....	14
	Hard clay in bank.....	e	2.27	....	e	1.92	0.22	....	e	....	....	....
Implements:	No. 3 Shovel—Contractor's wooden wheelbarrow.....	f	2.36	....	f	2.05	0.13	....	f	....	....	....
Conditions:	Day work for a contractor											
	By previous observation..	a	1.24	13	a	1.23	1.23	13				
Average barrow load of sand is 2.32 cu.ft.		b	1.36	....	b	1.38	0.15	....				
clay 2.15		c	1.59	....	c	1.60	0.22	....				
		d	1.83	....	d	1.78	0.18	....				
		e	2.08	....	e	2.05	0.27	....				
		f	2.33	....	f	2.23	0.18	....				

Time	COMPLETE OPERATIONS	Total time, min.	Total picking	Total shoveling and wheeling, min.	Time per barrow min.	Rest and delays	Gross time
7 a.m.	Commenced loading sand.	....	....	....	....	....	....
9:02	43 loads wheeled 50 ft.....	22	....	122	2.84	....	....
9:50	Picking hard clay	43	....	....	....	....	....
11:39	29 loads clay wheeled 50 ft.	109	....	....	....	....	....
11:46	Picking hard clay again..	7	55	....	1.67	....	....
12:01	4 loads clay wheeled 50 ft..	15	....	124	3.76	....	....
.....	.....	361	....	....	....	....	....

DETAIL OPERATIONS		No. observations	Time per barrow min.	Time per shovel	No. shovels per barrow	Time wheeling 100 ft.
a	Filling barrow with sand	4	1.24	0.094	3.2	....
b	Starting.....	4	0.182	....	....	....
c	Wheeling full—50 ft.....	4	0.225	....	....	0.450
d	Dumping and turning	4	0.172	....	....	....
e	Returning empty—50 ft.....	4	0.260	....	....	0.520
f	Dropping barrow and starting to shovel.....	4	0.162	....	....	....
g	 Total	....	2.24	....	....	....
h	.....	....	....	....	....	....
a'	Filling barrow with clay.....	4	1.948	0.144	13.05	....

NOTE: Comparison of "Detail" with "Complete operations" shows that about 27% of the total time was taken in rest and other delays.

But investigation into the amount of work that can be done may be carried to almost any degree of minuteness, covering both the tools employed and the nature and disposition of the men.

Experiments have been pushed forward, for example, for determining which size and shape of shovel will yield the greatest results with the least effort. A shovel holding twenty-two pounds seems to be the scientific load on which a man can do his maximum. A smaller shovel increases the time of loading by requiring sixteen or eighteen shovelful to the barrow; a larger one, while it enables the laborer to fill his barrow in ten or eleven loads, is less economical than the standard because the time required to fill and lift the larger shovel exceeds the advantage gained in the fewer loads. So with the barrow. This will vary with the weight and nature of the material handled, with the distance it has to be wheeled, and especially with the slope of the incline up which it has to be pushed. All this will seem to many to be an unnecessary refinement of the time study principle. Yet when, as in the case of construction work of the kind used for illustration, the operations are standard and are to be repeated thousands and tens of thousands of times, year in and year out, the task of carrying on the investigation will effect savings that will in a very short time more than pay for the time and trouble involved.

Experiments have also been carried on for the purpose of discovering what relation there is, if any, between the amount of work done by a man (foot pounds of energy expended) and tiring or exhaustion. Investigation in this field has not yet been

fully worked up, but some interesting results have been secured. It has been discovered that for every weight a man carries on his arm, pushing or pulling, he can be under load only a certain percentage of the day. The remainder of the time he rests. Moreover, by distributing the periods of rest and work at exactly the right intervals more work can be accomplished and the laborer will be in better physical condition at the end of the day than if the whole matter were left to chance or choice. This principle, while an important one, is not capable of general practical application even to purely physical labor, because few men will consent to have their activities so minutely restricted.

Experiments to find out the best men for any given task yield larger and more practical results. For every kind of work there are naturally men of certain physical and mental makeup that are especially well fitted to do this work. Where conditions are favorable, these men can be discovered by setting a large daily task to be performed, providing extra reward for those who finish the task and discharging those who do not.

An exceptional illustration of this method is described by Dr. Taylor. A body of workmen in the Bethlehem Steel Works, engaged on purely manual labor, had been earning \$1.15 a day on day work. After a considerable amount of experimentation and study of unit times, the men were put on piece work and given a task that would require them to do about four times as much as formerly, with an increase of pay to \$1.85 a day in case they finished their tasks.

On the workings of the system Dr. Taylor says in part:

“They were practically all first-class men. * * * The tasks were made purposely so severe that not more than one out of five laborers (perhaps even a smaller percentage than this) could keep up.

“It was clearly understood by each newcomer as he went to work that unless he was able to average at least \$1.85 a day he would have to make way for another man who could do so. As a result, first-class men from all over that part of the country, who were in most cases earning from \$1.05 to \$1.15 per day, were anxious to try their hand at earning \$1.85 per day. If they succeeded they were naturally contented, and if they failed they left, sorry that they were unable to maintain the proper pace, but with no hard feelings either toward the system or the management. Throughout the time that the writer was there, labor was as scarce and as difficult to get as it ever has been in the history of the country, and yet there was always a surplus of first-class men ready to leave other jobs and try their hand at Bethlehem piece work.”

In this case the standard was set extremely high and yet the plan succeeded because of exceptional conditions. In the first place the men were not subject to the dictates of a labor union whose rules imposed a restriction on the amount of output or objected to a task system. Second, the establishment was located in a fine labor market, so that there was no difficulty in finding men to take the places of those who dropped out. Third, the work was such as called for no especial skill or previous training, so

that vacant places could be filled by any man who possessed good health and strength.

There are, as we have seen, limitations to the study of unit times, limitations imposed by the nature of the work, by the skill and intelligence required of the men who perform it, and lastly by the degree of accuracy which it will be profitable to attain. For most practical purposes the investigation of foot pounds of energy expended in its relation to timing will not yield results worth the trouble of investigation, because other factors enter the problem in so large a measure as to overshadow entirely the benefits of the greater accuracy so secured.

The answer must be an approximation, but it is not on that account valueless. It will tell, within certain fairly well defined limits, the amount of pressure that will yield, for all practical purposes, the required power. When we are dealing with human beings, accuracy that is theoretically almost absolute may be determined if the experiments are carried to the last degree of minuteness. But for practical purposes the unknown and indeterminate factors influence the result much more largely than is the case when we are dealing with machinery. No man will consent to have every second of his working day kept under the absolute dictation of a superior officer. Even if he would consent to this, the impossibility of supervision so minute and all-seeing as to keep track of every movement clearly shows the impracticability of absolute precision. For each class of work, for each group of workmen, the employer must determine what the significant figures

are, how close to absolute accuracy it will be worth his while to go.

It has not been possible to give in this chapter more than the briefest outline of the principles involved in a study of unit times. The subject is so vast and so full of possibilities, many of which are as yet undiscovered, that a full discussion would fill many volumes. The average employer or manager who attempts to take up the study of elemental units of work does not realize at first either the importance of the task nor the difficulties he is to encounter. The study of unit times is an art, a new trade, with its own peculiar implements and methods, without a careful understanding of which progress will necessarily be slow. When it is undertaken by an energetic man with the determination to succeed, and to keep at it until he does succeed, the results which he can secure will appear marvellous. Those who are interested in following the subject further are referred to Dr. Taylor's papers in the Transactions of the American Society of Mechanical Engineers, Volumes XVI and XXIV. It is to be hoped that as experiment and investigation into this subject proceed, the results will be published in a form that will make them available for practical application in a large number of industrial establishments.

CHAPTER XV.

EFFICIENCY AND WAGES; THE TASK PRINCIPLE.

It is obvious that the determination of standard times for machining, the elimination of wasteful functions from the workman's operations, and the study of unit times for all kinds of work, leading as they do to the establishment of a minimum record for all jobs, should logically be accompanied by what is known as the task system. That is, as soon as it is definitely known just how much work a man can do, and all the conditions that will enable him to attain the maximum output have been introduced, it is important to introduce measures to provide that this output shall not fall short of the maximum; in other words, to set a task which must be performed.

In the systems of paying wages which have already been considered it will be remembered that for the most part there was only an inducement offered to the workman to do his best. There was no definitely assigned task which a man was required to perform or suffer some penalty. But with the determination of the maximum amount of work that can be done in a day it is possible to set some definite mark as a day's performance and to require that this standard be attained. Whether this plan is ad-

visible or not will require a careful consideration of many factors relating to the work and the men. Wherever practical it will undoubtedly result in a saving in costs of production. However great may be the incentive to increased output in guaranteed piece rates and other inducements, the average workman will not accomplish as much if his production is left to his own discretion as he will if he is assigned a definite task, a given amount of work which he must do within a specified time. This is a principle that is fundamental in human nature, and its force should be recognized. It is well known that a bicycle rider will do a mile in less time if he is paced than if he covers it alone, though in both cases he exert himself to the utmost. Try as he will, he cannot equal on his own incentive alone, the record that he can make if his task is set for him.

So it is with men engaged on a piece of work. If they are given no definite task, there are some men to whom an easy half hour before lunch, or an easy hour before closing time will appear more attractive for the moment than the extra twenty or twenty-five cents that will come to them at the end of the week. All men are not equally ambitious nor equally energetic and industrious. Left to decide the amount of their output for themselves, a few extra pennies near the close of a hard day's work are liable to lose all their charms. But if they are given a definite task to perform under the proper arrangement of pay, all this is changed. The accomplishment of the task may not mean only a few cents additional pay, but may be made to assure them a considerable bonus; failure to accomplish it may mean to them an

indifferent rate of pay for the whole day's work, so that their previous efforts are liable to go for nought because of a few moment's let-up. The accomplishment of the task before the hour set for closing in any case means that they may take their ease for the remainder of the day. In the establishments where the wise rule is followed of letting the men go home as soon as their tasks are finished, the incentive to maximum effort all the time will rise above all desire to slow up either at the end of the day or at any other time.

In most kinds of work the workman is in a sense given a task. That is, he is told in a more or less definite way what he is to do. Even the office boy is given an outline of his duties, such as copying letters, running errands, and what not, before he starts in; the man employed on day work usually knows more or less definitely what is expected of him. On piece work no precise amount of work is assigned, but the workman is expected to do enough to earn the average wages of his class. This is not what is meant by the task system, scientifically applied. What is understood is a scientific determination of the precise amount of work an average or even a first-class man can do when working at high speed under the best possible conditions, and the assignment of that amount of work as a minimum task. As we have seen, there are many kinds of work that cannot be reduced to definite measurable units of like size, and which must be paid for by the day. Yet wherever practicable the task idea should be applied as far as possible. Even work of a miscellaneous character should be grouped into a number of operations

so as to make up a large daily task for one man. If accurate inspection of the work is made and records are kept a bonus can be paid for accomplishing the task, and a penalty—at least that of not earning the bonus—can attach to failure. The assignment of a fixed definite amount of work in all cases will, as we have seen, tend to increase the output.

The simplest form of the task system under piece rates is to fix the rate at such a point that the man who accomplishes the standard maximum output will be enabled to earn just the percentage above his average wages that will induce him to accomplish the task. Those who come up to the mark set are paid anywhere from thirty to one hundred per cent above the normal wage; those who fail are discharged.

As we have already indicated, there are practical difficulties in the way of this theoretically ideal system. First of all, it may not be possible to get men to take the places of those who would be discharged under the plan. If the work requires special skill or intelligence the natural supply of labor is correspondingly restricted. It may be that the work would require several weeks or months of training before new men could hope to come up to the mark even of the men who had failed to reach the standard. In this case constantly discharging men and training up new ones to take their places might for a long time cost more than retaining those of the old employees who did not come up to the standard.

It may be averred that this difficulty could be obviated by setting the standard lower so that most of the workmen could reach it. This may be done,

but it means a cost of production greater than the possible minimum. The question before the employer is, Do I wish to afford the time and expense of filling my shop with strictly first-class men, and ultimately secure the lowest cost of production? The man who sets the highest standard will have to reconcile himself for a long time to added costs incidental to discharging the mediocre workmen and training up other men who may or may not ultimately turn out to be first-class. Gradually under such a system the first-class men would remain and the indifferent ones drop out until in the end the department would be filled with picked workmen, turning out the maximum product and earning high wages. In the case of simple manual labor, requiring no skill or experience, the question of whether a new man is a first-class workman or not is decided in a few days. There is here no expense of training and little loss from shifting workmen, and a body of first-class men can be gathered together in a comparatively short time.

Another objection to the above mentioned system lies in the antagonism it is liable to arouse in the workmen. Unless carefully managed, under ideal conditions, it looks too much like forcing an employe to turn out a certain abnormally large amount at the risk of being discharged. It may be stated at the outset that no plan that contemplates forcing the workmen to increase their output under any conditions can hope for success. It not only involves an infringement on the personal liberty of the workmen, but if allowed free scope would permit a driving employer to compel his men to work at breakneck

pace. It is for these reasons that most workmen are inalterably opposed to a task system, as such.

There is no doubt that in the hands of a driving manager or employer the task system may degenerate into a club to force the workman to complete a certain amount of work per day or lose their jobs. And that, stated in its barest terms, is what the simple task system above described amounts to. Under wise, efficient, and just management such a system would result in larger output, lower costs of production, and higher wages; yet the workmen may and usually will oppose it on principle, on the ground that it might when once under way be used to secure an excessive amount of work at lower wages when conditions arise in which the workmen could ill afford to resist the demands of the employer.

It may be inferred from the foregoing that the task system is not bad in itself, but may under certain circumstances put in the hands of the employer an instrument by which, if he were so inclined, he could oppress the employes working under that system. The case is nearly parallel to that of a trust which has secured a practical monopoly of an article of general consumption. The monopoly power may not be invoked to enhance prices to consumers or lower prices to the producers of the raw material, and the best interests of the concern may be against such a proceeding. But the power to work harm to the community for a greater or less period of time by these measures is present, and is therefore a constant menace. For this reason a combination of this sort is held illegal under the common law. The employer may not use the task system to work harm to the

interests of the laborers, but the power to do so is present and may furnish a constant menace to the well-being of the men. For this reason considerable opposition to the plan may confidently be expected when it is introduced, and unless this opposition can be overcome by confidence in the honesty and fair dealing of the employer, will not prove a success.

If in spite of these obstacles it is believed that the simple form of task system can be successfully adopted, it is proper to inquire what measures should be taken to avoid friction, to insure efficient operation, and to gain the hearty support of the workmen.

Clearly, no coercive measures of any sort may be taken. The workmen must come into the plan of their own accord, induced by the prospect of high wages and by confidence in the employer's promise that these wages will not be cut. The best way to secure this is by means of a striking practical object lesson. Secure an intelligent man and train him in the new methods. Promise him an advance of say sixty per cent over his present wages for accomplishing his task, and let him work side by side with the men who are pursuing the old methods at the old wages. If there is danger of his being intimidated into giving up his work by his fellow laborers, he may be made an assistant foreman or job boss. Make no attempt to over urge the other employes to adopt the same plan, but make it plain that the same rewards are open to those who will do the same amount of work, and that there will be positively no reduction in the rate of pay. However great may be a workman's opposition to task work on principle, it is hard for him to get away from the fact that next

to him is a man earning sixty per cent more wages for following instructions, day in and day out. As time goes on and it is seen that the task, though large, is one that can be performed without detriment to health, and that with its performance the increase of pay goes steadily on, the men will cease opposition based only on a principle that may have no practical application. One by one they will ask to be put on the new basis.

As a larger and larger number of men take up the system, the increased output secured by these efficient workmen will allow the manager gradually to drop those who from lack of ambition, laziness, or determined opposition refuse to take up work under the new basis. At the same time it can be made clear that as the standard set is a reasonable one for a first-class man, those who continually fail to perform it cannot be regarded as first-class workmen and must be discarded. It must be made entirely plain to each newcomer that he who cannot earn the sixty per cent higher wages must make way for some other workman who can. If the system is once under way on this basis, it may be expected to meet with no further opposition. The men who come into the plan with a clear understanding of what is expected of them, who see that the task set can be and is daily performed by a number of men, have only themselves to blame if they are discharged from failure to come up to the mark.

It is only fair to say that the foregoing plan will not succeed in all cases. There are bodies of workmen so thoroughly imbued with opposition to the task method that they will not permit of its adoption

under any circumstances, and may determine to walk out in a body at the first attempt to introduce it. In any case, the greatest caution must be observed to prevent the workmen from feeling that the new plan is opposed to their interests. If for any reason they have not confidence in the good faith and honest intentions of the employer, he might as well give up all hope of bettering the conditions of the workmen or himself by the adoption of the simple task system.

Another weakness in the simple task system lies in the difficulty of applying it justly during the period of transition from the slow pace of the ordinary workman to the high speed demanded by the standard output of a day's task. It is undoubtedly true that men who have been soldiering some four hundred per cent cannot at once change to the standard minimum time. Nor can a man who is started on new work be expected to do it at first as well or as quickly as he will later. A little thought will show that the difficulty here is more serious than it seems at first. The task idea embodied in scientific principles demands that a piece rate be set which will allow the workman to earn thirty to one hundred per cent above his average wage in case the work is done in standard time. This may mean, in case workmen have been soldiering four hundred per cent, that the rate be cut to one-third of what it was before. When the workman has come up to standard time he will be earning on this basis some thirty-three per cent more than formerly. The question is, what will he be earning while he is learning to do the work in standard time? If it is difficult to learn the trick at first, and the new rates be imposed at once, the work-

man will suffer an immediate cut in wages of sixty-six per cent—a result impossible for any man to contemplate with equanimity. If the old rate be kept until the man has attained the mark, he will naturally be earning higher wages while he is learning than after he has acquired the requisite skill. Naturally under such circumstances he will put off learning the art of doing the work in minimum time as long as he thinks safe—in other words, soldier—and when he has reached it will feel aggrieved that his wages must come down because he has acquired skill so fast. Does someone suggest a gradual cut? Those who have read the preceding pages will remember what dangers lie in the way of the policy of gradual reduction of piece rates.

The foregoing difficulties are to be measured by the degree of ease with which the ordinary workman can attain standard time on any particular job, though in inverse ratio. In the case of simple manual labor which anyone with health and strength can do, the conditions demanded by standard minimum time call only for additional physical exertion, alertness, and industriousness. Whether a man can perform the task or not is very soon determined, and no special deprivation attaches to starting the workman on the new basis at once. He may even be paid by the day for a short period on condition that he come up to the standard at the end of the period or drop out. But where the conditions imposed by the standard time are difficult to learn and a considerable period of training is necessary, these simple measures are not always sufficient to secure justice to the workman or to prevent his unnecessary prolonging

of the period of apprenticeship. For these reasons the application of the simple task system has often failed or proven unsatisfactory. It has failed because men were not willing to accept the low scale of wages imposed by the system while they were learning to come up to standard time. Where this difficulty has been overcome, it has still proven unsatisfactory because many good men in making the jump from low speed to high speed failed to make good at first and were dropped out.

It is evident from the foregoing that there are many sets of conditions under which the simple task system will not meet all requirements. The question that now comes up is, can we not find some system or systems in which the task idea with all its advantages is retained, yet which avoids the many difficulties which are met with in applying the simple system? There are two such systems, which have been mentioned by name, but not yet discussed. One of these is provided by Mr. H. L. Gantt, known as "Task Work with a Bonus," invented and applied by him in the organization of various industrial establishments; the other is the invention of Dr. F. W. Taylor, known as "Differential Rate Piece Work." Let us turn now to a consideration of these systems.

Task work with a bonus is related on one side to the task system, and on the other to the premium plan. It differs from the simple task system mainly in the fact that there is no severe and direct penalty such as discharge imposed for failure to complete the task; or, in other words, for failure to average a certain standard of earnings. The workman who

completes his task is given a large extra bonus sufficient to induce him to make all reasonable efforts to accomplish the amount of work assigned. The advantages of the task system are thus attained. The man who under the premium plan might be tempted to ease up for an hour or so occasionally (we are not speaking, of course, of necessary rests or delays) because he feels that it only means a few cents difference at the end of the week, will scarcely be so tempted when a few minutes' idleness may make a difference of fifty or sixty per cent in the whole day's pay. Rather will he work at his best until the bonus is earned, and then he is free to do as he pleases.

Task work with a bonus shares with the premium plan two desirable features. In the first place the workman who does not finish his task is in the same position as he who does not earn a premium: he is paid a given price per hour which is guaranteed, receives his ordinary day's pay, and suffers no additional loss beyond that of the extra premium or bonus. Second, both plans are in themselves optional. There is no compulsion to the workmen; they can take the bonus or leave it, as they think best. Of course it is expected that after the workmen have seen one or two of their number adding fifty per cent to their pay right along, day after day, they will be eager to go and do likewise, provided, of course, they are guaranteed against a cut in the rate.

It will be noted that the bonus plan is a little more severe than the premium plan, in that the additional pay does not accrue until after a certain

standard of output has been reached. But at the same time it is more perfect in principle. As we have seen, workmen will do more when a certain definite task is assigned. Under the premium plan the amount of work done will vary with the ambition and initiative of the individual, unassisted by any standard as to the amount that should be done. Fewer men will reach as high a degree of productivity under this plan than under one where, so to speak, a pace is set, a definite goal is to be reached.

The bonus plan is more mild than the simple task system, and for this and other reasons is much more flexible. Workmen who may well object to a system that assigns them a task and subjects them to the penalty of discharge in case of failure will feel much more favorably disposed toward one that gives them a high reward in case of success and imposes no burdens or disabilities in case of failure. Of course the bonus plan may be made to differ in name only from the simple task system, in that the employer may gradually adopt the policy of transferring or discharging those who persistently and regularly fail to earn the bonus. Some employers even regard this as one of the best points about the bonus plan, in that it sounds so fair and reasonable that the workmen will not hesitate about taking it up in the beginning, while the dropping of a man here and there is an occurrence so ordinary as to excite little comment and prevents the workmen from realizing that the task system pure and simple is hanging over their heads.

It must be admitted that the comparatively easy transition into the more exacting (and more efficient)

task system constitutes a feature of flexibility in favor of the bonus plan; but it is doubtful if this shift should be made without definitely taking the workmen into the employer's confidence. In all things it pays the employer in the long run to be perfectly square and open and above-board in all dealings with the men. Trickery and even subterfuge will sooner or later be discovered and will create more disturbance when the employes pry the secret loose of their own accord than if the management announced squarely its intentions in the first place. Besides, a trick once tried, though it may succeed in the first instance, will so destroy the confidence of the men that it will not succeed again, and the most honest plans thereafter will be viewed with suspicion and alarm. If an employer, after starting the bonus plan, decides that he should get rid of those who do not earn a bonus and keep only those who do, it is possible that a gradual dropping out of the inefficient will not for a time arouse any suspicion because the capable men who are left will have no grievance. But when he tries to introduce the bonus plan in another department where the men are opposed to the task system, these men will take stock of what has happened in the other case and jump to the conclusion that sooner or later those who cannot or do not wish to earn the bonus will be shouldered out of their jobs.

But suppose a manager has entered into the bonus plan in good faith, and after awhile decides that conditions are ripe for the task system, by means of which he can fill his department with none but first-class men. In that case let him announce

openly that he intends to have only first-class men, and that after a period of one month or two months or three months, as the case may require, those who cannot earn the bonus must expect to drop out. This honest announcement will be appreciated for its open dealing, and the desire to have only men of the best calibre will be understood. The granting of a period of time in which the backward ones can do their best to come up to the mark, and if they find they cannot make it will still have time to look for another job, assures the men that the employer is giving an equal opportunity to all and is anxious not to bring any unexpected hardship on the incapable employee such as a summary discharge would involve. Likewise those who are unwilling to work under a task plan from principle will be given plenty of opportunity to make other arrangements.

Task work with a bonus thus appears as a valuable stepping stone toward the more difficult but more efficient simple task system. The honest and wise employer should not, however, inaugurate the bonus plan with the intention of gradually forcing the straight task system on the employees without their knowledge. If the latter plan is to be ultimately adopted, let it be clearly understood beforehand that after three months or six months those who cannot earn the bonus must drop from the ranks.

The greater flexibility of the bonus plan appears in many other instances than the ones already cited. We have already noted that the length of time in changing from low speed to the high standard shown to be possible by scientific experiment and study will vary greatly with different kinds of work. If the

old time methods have been exceptionally wasteful and the amount of soldiering, either conscious or unconscious, amounts to several hundred per cent, it may not only take a considerable time for the workmen to attain to maximum speed, but a bonus or a premium that in the end would be reasonable, will at first appear impossibly small and difficult to earn. Much of the difficulty arising from this source will be obviated, as we have seen, if the management can definitely demonstrate that the work can be done in say one-fourth of the time usually taken. Yet it may be that a long time must elapse before the average workman can get up to the maximum output, and in the meantime with the task system he is earning nothing extra, with the premium plan he is earning very little, and the goal may appear too far off to give him courage to proceed.

Here the adaptability of Mr. Gantt's bonus plan again becomes manifest. An arrangement may be made to meet this condition by which the workman can be given at first a longer time to do the job and yet earn his bonus, or some part of the bonus. Then the time can be shortened and the bonus increased, the workman being given clearly to understand that he will be expected in the end to do the work in the standard minimum time if he is to earn the extra reward; that the first bonus is merely to give him time in which to learn how to do the work in minimum time.

This plan with its variations may become too complex, and some managers prefer to give the whole bonus all along the line, simply shortening the time in which the job must be done as the workmen be-

come more and more skilled. Others prefer to give the bonus only when the job is done in minimum time, trusting to the common sense and ambition and foresight of the workmen to spur them to the effort necessary. Still others prefer a string of bonuses, so to speak, giving half of the extra reward when half the time has been saved, and so on. This latter plan may appear on the surface to be no different from the premium plan in that there is a graduated extra reward for extra effort. It differs, however, in that there are certain definitely marked periods of advance for the laborer to strive for, and a definite goal set in the end, thus securing all along the line the advantages of mapping out a definite task to be performed. Which of these plans should be adopted will depend upon the attitude of the men and the nature of the work; and those who have followed the principles brought out in the preceding pages will experience little difficulty in determining what plan will be best suited to any given set of conditions.

Whether the bonus is to be given only when the job is completed in the standard time, or is awarded at some point between this and the ordinary time, the workman should know definitely that the management will expect him to do the work ultimately in the quickest time that the conditions of the case make practicable. This quickest time should be definitely stated on the instruction or time cards or both, so that the workman will not only have it constantly before his eyes, but each time he sets down his own record he will have the standard staring him in the face. Thus, if a longer time is allowed at first there will be no possibility that the men will be under

any misapprehension that the management does not know just how quickly the work can be done. When the maximum time in which a bonus can be earned is reduced they will understand that the reduction was planned from the beginning, that the longer time was only a favor to them to prevent hardship while they were under apprenticeship, and that there is a definite point beyond which no further reductions will be made.

In the case of a series of partial bonuses leading up to the full reward or of a series of "times" for which the full bonus will be paid, it is best, wherever possible, to have every item set down definitely and leave nothing undecided as to just when each bonus shall apply or when the standard time is to be required. Otherwise the workmen will be under a natural temptation not to learn any faster than is absolutely necessary. Where no bonus is to be paid until the standard time is attained, the instruction or time card may read:

Standard time (expected Nov. 1, 1909).....	50 minutes.	Bonus 10c
Time actually taken	.. minutes.	Bonus ...

A series of "times" leading up to the standard, but with a full bonus for each succeeding record, should place a definite limit to the period during which each record will entitle the workman to a bonus:

Standard time (Nov. 1, 1909).....	50 minutes.	Bonus 10c
Bonus allowed Sept. 1 to 30, 1909, if job is done in	100 minutes.	Bonus 10c
Bonus allowed Oct. 1 to 30, 1909, if job is done in	60 minutes.	Bonus 10c
Date..... Time actually taken....	.. minutes.	Bonus ...

Similarly a series of partial bonuses with graduated times, leading up to the standard with the full bonus, should be equally definite:

Standard time (Nov. 1, 1909).....	50 minutes.	Bonus 10c
August 1 to 31, 1909, if job is done in.....	120 minutes.	Bonus 5c
Sept. 1 to 30, 1909, if job is done in.....	100 minutes.	Bonus 6c
Oct. 1 to 30, 1909, if job is done in.....	60 minutes.	Bonus 8c
Date.....	Time actually taken....	.. minutes. Bonus ...

Delimitation so close and precise as this will not, of course, be possible if the management has had no experience in training the men up to the standard time and has no means of knowing how long the period of apprenticeship should be. It might seem that the advantages of stating definitely to the men just what they are expected to do and just what they can earn for three or four months ahead would justify a manager or foreman in making an estimate and sticking to the schedule to avoid all possibility of misunderstanding. This is true if the estimate is liberal enough to give everybody all the opportunity that can reasonably be expected to enable them to attain the maximum output. If not, some really good men are liable to find the pace too severe at first and in consequence find themselves unjustly dropped from the ranks.

For it should be understood that the schedule, once made out, must be strictly adhered to. If exceptions are made here and there, everyone will feel that he is as much entitled to an exception as the next man, and the whole scheme is liable to fall through. A backward step is fatal. No plan can be "tried out" and hope to succeed. Those that must go through are the only ones that bring results. It may

therefore be better for a manager to give himself some discretion by not imposing a fixed schedule than to set up blindly a series of records and bonuses and time limits that will prove unwieldy and unjust in actual operation.

There are many classes of work in which the bonus plan is to be preferred over the simple task system, not as a stepping stone to the latter but as a system to be adhered to permanently. The simple task plan can best be applied where the work from day to day is absolutely unvarying and where the workman can acquire the automatic skill and dexterity that goes with tasks that are repeated day after day. We have already noted that wherever possible the principle of division of labor should be applied so that each man will have as few separate and distinct kinds of work to perform as the conditions of the establishment will allow. There are, however, and always will be, men whose work must be varied more or less from day to day, because the organization has not reached the point where a separate body of men can be detailed off to perform a single set of operations. This represents one of the many cases where the absolute minimum standard time cannot be fully insisted upon in making up a day's task, because work that is done even every other two or three days cannot as a rule be done as quickly as routine work that comes every day. It can easily be seen, too, that the simple task plan cannot be well applied here, because all men cannot turn from one kind of work to another with equal adaptability, even though they be first-class men in other respects. But the bonus plan at least guaran-

tees the full day's wage, and the man who falls short of the maximum output need not fear the loss of his job as in the task system. In this case no attempt should be made to change over from the bonus plan to the simple task system, unless indeed the various jobs are so nearly alike that no difficulty is experienced in changing from one to the other. In case there is a wide difference in the nature of the several kinds of work it is better to set a rather lower task than otherwise. A comparatively low task that is tried for by the average man is better than one set so high that most of the men will be content to take their hourly wage and work at a leisurely pace.

Somewhat analagous to the foregoing is the case where standard work comes in irregularly, say from three to five days a week. The men who do this work must be employed continuously, but when their regular work is not at hand they are distributed at various jobs throughout the establishment, according as one department or another has need of extra help. The bonus plan can be applied to their regular work, and while they are foraging around, so to speak, they are sure of their usual day's pay.

Another advantage in point of flexibility claimed for Mr. Gantt's bonus plan applies to work of the same nature that under certain conditions has to be done by two widely different grades of labor. Suppose as in the last case that the work that comes in irregularly must be done by especially high priced and skillful mechanics. The work that they are especially kept for may come in very irregularly, so that there may be periods of considerable length during which work of a different nature must be found

for them elsewhere. If they are put on piece work with less efficient, lower priced men, and the rate per piece has been adjusted to the lower grade of labor, they will earn less than their average rate of wages. Of course, to put two piece prices on this work, one for the average man and a higher one for these special men, will cause the greatest feeling of dissatisfaction and injustice on the part of those who must work at the lower rate. In this case it is said a bonus can be fixed on work of this kind, to be paid to all, but so graded that only the more efficient high priced men can earn it ordinarily.

This arrangement appears of doubtful practical expediency in ordinary cases. In the first place it is hardly probable that the high priced man, however skillful and efficient he may be at his own kind of work, will be superior to the low priced laborer at work with which the latter has become familiar by long experience and practice. In other words, it is doubtful if the bonus could be arranged on equal terms for all so that the high priced man alone could earn it. Second, if the specially skilled mechanic is so much superior to the ordinary man at his lower grade of work, a simple piece price would enable him to earn more than the other—though it is possible he might not earn enough more to make up his average wage. Third, if the laborer of lower grade is working on a task system, it is unfair to him to set the task so high that he could not earn a bonus, and the plan would thus carry with it relative inefficiency in the lower grade of labor. If the work is of such a nature that the higher classed man could really do more than the lower classed man at his

own kind of work, two bonuses could be arranged, a higher and a lower one, but this would rarely occur. Perhaps the best solution of a difficulty of this kind is to pay the two grades of men on entirely different plans, the special mechanic receiving his ordinary hourly rate of pay and the others working by the piece with a premium or bonus and task system. Then it will be recognized readily enough that the two grades of labor are not competing with each other or working on the same basis, and that the higher grade man is simply filling in his time temporarily until his own kind of work comes along.

Various and ingenious plans have been invented to meet this special case, but as a discussion of these would carry us too far afield into a subject that is not of exceptional importance, it is best to keep to the main highway.

We come now to a consideration of the **differential rate piece system** invented by Dr. F. W. Taylor, and applied by him and others to many kinds of work. It stands logically between the simple task system and the bonus plan in point of severity in the adjustment of wages and in the power of the stimulus it applies to the workmen. The differential rate carries with it the task idea in that the employe is given a special inducement to perform a given amount of work in a day by the payment of a bonus, but is not threatened with the loss of his job in case of failure, as in the simple task system. In place of this penalty another is substituted, namely, a wage lower than normal for those who fail. In task work with a bonus the man who fails to perform his assigned amount of work receives at least his aver-

age rate of wages, and loses only the large extra reward that is paid to those who succeed. Whether he falls short of this task to the extent of only five minutes or half a day, the pay is the same—the given price per hour. With the differential rate not only is a penalty attached to failure to perform the task, but the penalty is made proportionate to the degree or extent of failure. The man who falls short of his task is made to lose not only the large bonus; he suffers the direct loss of the piece price on each piece by which he falls short. A concrete example will serve to illustrate the workings of this system:

Suppose a certain piece of work has been made the subject of time study and experiment, and it has been determined that an average man can turn out ten pieces per day when working at his best. The general rate of pay for that grade of labor has been \$2.50 per day. It is decided to put the work on a differential piece rate basis. The men are then told that they will be paid 25 cents per piece, but if they succeed in turning out ten pieces or more per day they will be given 35 cents per piece. One queer result of this system is that nobody will earn just his average day's wage. In the illustration each workman will either earn upwards of \$3.50 a day, or less than \$2.50. Incidentally the illustration shows how powerful is the stimulus supplied by the task system. The difference between nine and a half pieces and ten with simple piece work would be only eight or nine cents, which with many men would not be sufficient to offset the pleasure of half an hour's leisure toward the close of the day. With

the premium plan the extra half hour would mean only three or four cents. With the bonus plan it means a dollar's difference in the day's wages, though the normal wage be guaranteed. With the differential rate system not only is the dollar bonus lost, but the half piece left unfinished causes a loss of an additional twelve and a half cents from the normal wage. Nor do the mere figures tell the whole story. There is an undoubted stimulus to good work in the fact that the workmen can idle as much as he pleases after he has finished his stint without any objection on the part of the foreman and without any uncomfortable feeling on his part that he is wasting valuable time.

The advantage of the differential rate over task work with a bonus lies in the fact that the bonus plan furnishes no incentive at all to the man who for one reason or another finds it impossible for him to make the bonus on any particular day. Suppose a man has made a few blunders in the early part of the day, requiring him to waste half an hour or more doing his work over again. Of course accidental delays and the like should be taken into account in making up a day's task, but there will come to every workman days when everything seems to go wrong and he may find himself at nine or ten o'clock hopelessly behind in his rate for the bonus. If his average wage is guaranteed he is liable under the circumstances to say to himself, "There, I've lost the extra dollar for today; I might as well give myself a vacation for the rest of the day!" So he soldiers as much as he dares until closing time, taking his share

of the day's good things in the form of ease and leisure instead of money.

With the differential rate the man who loses hope of the bonus early in the day is liable to lose even more if he does not do his best up to the time of closing. Every piece by which he falls short of the standard represents a distinct money loss. He cannot afford to "take it easy"; since he cannot earn extra wages he must even forge ahead as fast as he can and come as near as possible to earning his normal wage.

The merits of the differential rate system make it the best for certain kinds of work. It is particularly useful where the same task is to be repeated day after day, where the maximum output at the lowest possible cost is a prime consideration, and where valuable plant and machinery call imperatively for rapid movement of stock and the elimination of wasted time in the operations of production.

Yet the limits within which the differential rate should confine itself are clearly defined. The severe pressure of an automatic and precise penalty precludes it from being applied where there is very much danger from any other cause than deliberate soldiering on the part of the workman, that the task will not be finished. Thus during the difficult period of apprenticeship, while the workman is changing from a slow pace to high speed, or while new work is being introduced, it is only fair and just to guarantee the average day's wage. Where the work varies more or less from day to day it may be advisable to encourage those who can quickly adjust themselves to changing conditions by offering a bonus, but it is

hardly fair to penalize good workmen who require the steady swing of work that is repeated day after day to reach the maximum output. In fact, the "jack of all trades" who can do almost anything fairly well is liable not to be so capable at steady routine work as the man who can plug steadily along on one job until he becomes an expert in his line. The bonus plan will give the wide awake and efficient manager an opportunity to sort out the routine workers from the "general utility" men and in the meantime will insure justice and equal opportunity to all.

In conclusion it should be noted that the most effective and most scientific systems of paying wages depend for their success on the standardization of all conditions, large and small, surrounding the work. In none of its forms can the task system prove successful unless all the workmen are using the same standard tools and appliances and pursuing the same methods. The slightest variation will prevent not only a determination of the amount of work that should go to make up a task, but will hinder or prevent the performance of the task assigned on the part of the men laboring under less favorable conditions. And where a definite amount of output is expected from each man it is doubly important that the conditions surrounding the work should be such as to furnish an equal opportunity to all.

CHAPTER XVI.

RELATIONS BETWEEN EMPLOYER AND EMPLOYED.

A broad discussion of the relations that do exist and of those that should exist between the employer and his men would carry us deep into the mighty unsolved problems of capital and labor, about which so many weighty books have been written, so many great-minded theories have been promulgated, so many industrial wars have been waged. He who would attempt to enter this great arena for only a brief period and with untried weapons must expect to cut but a sorry figure. The limitations imposed by time and space alone would be sufficient to compel us to stand outside the field of conflict, and point out in hasty review some of the features of the industrial warfare. If there are many problems that we cannot hope to solve, there are also many unhappy conditions that common sense has helped to improve, and we shall make a step forward if we observe and learn by the experience of wise and successful men.

From the point of view of the employer one of the commonest and most grievous obstacles to the free and untrammelled management of his business is the combination of employes and workingmen generally into labor unions. So serious has been the distress

caused both to business enterprise and to the public generally by the attempts of organized labor to enforce its demands, that we may well enquire whether workingmen have a right to combine for the purpose of raising wages and otherwise changing the conditions of employment.

It is well known that under the common law agreements aiming to raise prices are criminal. In the early English and American cases labor was regarded as a commodity, and combinations among workingmen for the purpose of raising wages were very frequently held to be criminal conspiracies. One of the earliest cases in this country was that of *People vs. Fisher* in 1835 (14 Wendell, 9), where certain journeymen shoemakers in New York had combined for the purpose of fixing the wages of members of the combination. Strange as it seems to us now, these men were indicted under the law which declared that if two or more persons should conspire to commit an act injurious to trade or commerce they should be deemed guilty of a misdemeanor. The court held that a combination to raise wages was injurious to trade or commerce, in that the best interests of society demands "that the price of labor be left to regulate itself, or rather be limited by the demand for it."

Let us see whether it is just to regard labor as no different from any other commodity, and to insist that free competition determine its price. It is clear enough that combinations of laborers may injure both trade and commerce, stop the wheels of industry, and compel the public to pay more for an article of convenience or necessity than would be the case if

there were no such things as unions, strikes, or lock-outs. At first sight it would seem that men who have labor to sell are in the same position as men who have boots and shoes, and a combination to force up the price of labor should be deemed as guilty as a conspiracy of the boot and shoe men to put up their prices, since both are admittedly injurious to the public interest. Yet when we look more closely we see that labor differs in many respects from more tangible commodities, and the effort to prevent the laborer from disposing of his product to the very best advantage carries with it greater injustice than when similar restrictions are placed on the sale of other products.

First, the laborer is at a distinct disadvantage in bargaining for the price of his labor. Whether he obtains a good price or not may make all the difference between imminent starvation for himself and those dependent on him, and comparative comfort. The capitalist employer has all the ammunition in this kind of warfare. If he does not hire one man, another will suit him just as well. The man who cannot sell his labor is plunged into privation and misery; the man who does not buy it suffers at most only a temporary inconvenience, a small loss that means little to him. For this reason the employer is frequently in a position to force laborers to take a price far below what their commodity is worth; and unless they can combine and make their cause a common one, injustice may be done resulting in unhappiness and actual want to a large body of men. Nor is it to be denied that employers as a class are sharper, brighter, quicker-witted and better informed

than the laborers. This is a factor which, even though other conditions were equal, would enable them to get the better of any transaction involving the sale and purchase of labor.

Again, labor is not like other commodities in that it is extremely perishable. The vendors of most articles of commerce can afford to wait, to hold their products for a better price. Labor, on the other hand, perishes in the waiting. The laborer who holds off for a month for a better price loses a month's wage. His product must be sold at once for the best price it will bring, for it steadily deteriorates if not sold.

Labor cannot seek the best market; it is, more than any other commodity, immobile. If the price of shoes happens to be low in Massachusetts they can be sent at little cost to California or Texas, where the price is higher. But the laborer is tied by many bonds to a single locality. Not only is the cost of transportation for himself to be considered but he may have a wife and family and home interests that he cannot leave without large sacrifice.

Another disadvantage against which the seller of labor contends lies in the fact that labor is the ultimate product by means of which a man may gain his livelihood. If a man has nothing else, he has at least the work of his hands to stand between him and starvation. He who has lands and chattels and stores in his granaries may sell them and secure the necessities of life; if he cannot sell them he may use them up himself; and lastly, if their sale or consumption will not give him all he wants, he still has labor to fall back on. The man who has labor alone to sell

has nothing else to fall back on; and the natural disadvantages he has to contend with in doing so makes it imperative that none but the most necessary restrictions be placed on his powers of bargaining.

These considerations, together with many others, combined to break down the legal theory that labor must be treated as any other commodity. "Wages," it was argued, "should be determined by the fair proportion that labor had contributed in production. The market price determined by supply and demand might or might not be fair wages; often it was not, and as long as workmen were not free, by combinations, to insist on their right to fair wages, oppression by capital, or which is the same thing, by their employers, followed."* From about the middle of the century the practice of holding labor combinations as criminal ceased, and the states enacted legislation relieving workmen from the penalties of what had so long been declared unlawful combinations or conspiracies.

As will be seen from this brief historical review, the formation and operations of labor unions are of comparatively recent growth. It is not our purpose to trace the rise of unionism or to give an account of its far-reaching influence on the relations of labor and capital. It may be worth while however, to point out some phases of trade unionism that affect the personal relations between employers and employes, that bring good or ill to the interests of both.

Part of the good that labor unions have done is indicated in the review given above of the disadvantageous conditions under which the laborer must sell

*Argument of the Court in *Cote vs. Murphy*, 159 Pa. St., 429 (1894).

his commodity. Unions have increased wages that were too low, shortened hours that were too long. They have increased the health and safety of the workingmen by introducing government factory inspection, with laws providing for certain standards of light, heat, air, and safety appliances in the work. They have partially eliminated child labor and done other useful, excellent and beautiful things. All of these have redounded to the direct advancement of the public weal and more or less directly to the advantage of employers. In increasing the health and contentment of employes there is always a gain in efficiency, but many employers are too short-sighted to see this until it is forced upon them. So far so good.

But many labor unions are swayed in their actions by theories that are false and are moved by aims that are contrary to the public interest. The lump of labor theory is responsible in hundreds of unions for rules and regulations that are disastrous to the interests both of employer and employe. With the idea that there is a fixed amount of work that must be done, unions generally attempt to limit the amount each man shall do with the purpose of leaving more positions open for other men or of creating a scarcity in the labor market which will give the men in any trade an opportunity to demand higher wages. We cannot refute the lump of labor theory in full; but it is obvious that restriction of output leads to higher costs of production, which in turn leads to lower profits or even losses to the capitalist. Men are induced to invest their money in business undertakings (and so create a demand for labor) solely by the pros-

pect of profit. If in any trade the union rules restrict output so as to lower profits, men will withdraw capital from that industry. The net result will be therefore to restrict rather than to enlarge the demand for labor. The undertakings from which capital is withdrawn pay not more for labor, but less.

In trades where piece work is the rule, a corollary to restriction of output is to forbid any man to earn more than so much. Where this rule is applied solely to prevent employers from cutting piece rates, we have seen that the workmen have little to gain and much to lose by not holding back. But where the workman is guaranteed against a lowering of the rates, and the union rule is enforced simply to "make work" for others, such a policy is obviously detrimental to the interests of all concerned. The workman is then cut off from the earnings that his energy and ability would entitle him; the employer's profits are cut down by high costs of production; while the withdrawal of capital from the unprofitable industry will ultimately cost the workmen even the small wages they are allowed to make. Reverse the conditions and the results appear in brighter colors. Let the workman be allowed to earn as much as he can without fear of rate cutting and suspend the union rule. The able men will then draw wages in proportion to their industry and skill. The employer's profits increase, but this increase does not come out of wages; it comes from a lower "overhead" cost, in that his machines run faster, his stock moves more quickly, his capital is turned over more rapidly. Lastly, this increase of profits attracts other men into the industry and the demand for labor in that

trade increases. The policy of freedom "makes" work where the policy of limitation of output destroys it.

Unfortunately this sensible policy will be found contrary to the beliefs and practices of most unions, because it emphasizes the fact that the employers' and employees' interests can be combined. Most unions are far too neglectful of the fact that the interest of the business that supplies them work is as much entitled to their careful consideration and intelligent support as the scale of wages paid to the men.

On another ground the limitation of output is unfair to the men and disastrous to the industry where it is in force. Whenever the rule, "Workmen should not be asked to do more than a fair day's work" is necessary to prevent sweat-shop methods and sixteen hour days, it is right and just. But this is rarely the motive; the intention is to make the work last. If the union admitted only first-class men, the rule might be applied without doing special harm. But as a rule unions admit to membership any man who will pay the dues, and as a consequence the "fair day's work" must be set at the amount that the slowest and most inefficient workman can do. Now it is apparent that the industry must either make a normal profit or go to the wall. The union rule practically compels the employer to hire only men equal in their output to that of the slowest and most inferior grade of workmen. If the industry is to make a profit at all, the wages paid can be only what the poorest man in the union is worth. The capable and efficient workmen are therefore compelled to work for lower wages than they could other-

wise earn. The rule therefore subverts the object of the union to secure higher wages; and any scheme which curtails the output thereby increases the cost of production and tends to lower wages in the long run.

An illustration of the absurd lengths to which restriction of output can be carried is furnished in certain of the English building trades. The limitation of output has gone to such a point that in many cases the workmen sit around a large part of the day doing nothing. Not many years ago bids were solicited for a building in London that had to be finished in three months. The English contractors all fought shy of a contract, declaring it to be impossible to put up such a building within the stated time. An American contractor who had made some study of the British workman's methods took the job and imported a body of American laborers. He had to pay them, of course, about three times the wages prevalent in England, and every one expected him to lose money. As a matter of fact, he had discovered that English trade union rules restricted each man's output so narrowly that the wages paid, low as they were, became excessive. For instance, a bricklayer was allowed to lay only five hundred bricks a day; his American workmen laid two or three thousand without working extra hard or for longer hours. The building was put up in less than three months and at a lower cost than had been counted on by those who figured on a basis of six months with output-restricted workmen. The whole of England is suffering more or less from the error

of limiting the output, and her workingmen are receiving lower wages in consequence.

There are many other features of trade unionism as it is now organized which make it a menace to the prosperity of workmen and employers alike. Consider; there are nearly two million men in America paying dues in labor unions. There are nearly ten thousand paid business agents or "walking delegates," whose business is solely to look after the laborer's interests and who draw support from the fact that labor and capital is, or is supposed to be, at war. The establishment of peace and good feeling between employers and employes would rob them at once of the pay they receive from the unions and of the power they wield over employers and men. It is to their interests therefore to foment grievances, to make discord, to stir up dissatisfaction, for this increases their power and seems to give a plausible reason for their existence. They are men who hope to rise by loyalty to the union, and they have everything to lose by helping along the interests of the employer. The members of a union too are inclined to look upon the dues they pay as an investment which should bring them an annual return in higher wages or shorter hours. The union leaders realize that the men will consider their money wasted unless some effort is made toward constantly increasing demands, and therefore spend a large part of their time scaring up grievances, whether real or imaginary.

This widens the breach between the two sides and fosters antagonism. The result is that the interest of the union and the interest of the business that supplies work is so sharply defined that they are made

into two hostile masters, both of which no man can serve. Members of a union hope to rise by helping along the union. They want more pay, shorter hours, easier work, regardless of the interests of the business that provides their means of livelihood. A union never meets to discuss methods and means to better the business. Men who are loyal to "the house," who have ambitions about bettering the business, who hope to become foremen, superintendents, and managers, are regarded as traitors to labor. They keep out of unions because they are not wanted there.

This sharp line of demarcation is for many reasons opposed to the best interests of employers, of men, and of the nation as a whole. It compels a man to join one side or the other, to fight for the side he joins and against the other. If he attaches himself to the union, especially one that has power to dictate the "closed shop," his life sentence as a laborer is written. He is shut off from the friendship and assistance of the employer, from the hope of rising to a higher station in life by attaching himself to the interest of the business that employs him. If the employer offers him twice as much pay for conscientious and energetic work he must obey the rule of the union which says, "This much shall you do, this much shall you earn, and no more." His ambition is throttled, his endeavor is held in leash. He cannot work when he wishes, because to strike is not a matter of choice; he must throw up his job at the dictate of the walking delegate, who has nothing to lose and everything to gain by stirring up discord.

This state of affairs in so many organized trades presents disadvantages as well to the man who joins

the side of the employer. He is thereby cut off from the friendship of his fellow men. He is perhaps persecuted in various ways; threats and intimidations are employed to induce him to join the union; his wife and children are subjected to wordy abuse. If the union succeeds in enforcing the closed shop he is thrown out of a job. At best, he feels that he is helping to cut himself and his fellow men off from the advantages that combination of labor, honestly and justly employed, bring to the working class as a whole.

There is no need to point out how employers and the nation as a whole suffer from a condition that presents the interests of labor and capital as being diametrically opposed. If the trades unions will be satisfied with nothing less than the shortest hours, the largest wages and the smallest output that the great power of combination enables them to squeeze out of employers, the forces of productive enterprise are throttled to the detriment of all. What becomes of the boasted efficiency of the American workman if his output is limited to that of the most ignorant foreigner who may chance to join his union? The workman is worthy of his hire, but the employer cannot pay more than a man's work is worth to him. Limitation of output and excessive demands for high wages cannot help but make an industry unprofitable and limit correspondingly the amount of capital that is invested in it, that is, the amount of labor for which it creates a demand. When business enterprise is thus paralyzed, the employers, the workmen, and the nation as a whole suffer the consequences.

The interests of employers and men are not inimi-

cal, and should not be considered as such. We have seen that the theory that workmen gain what employers lose is a fallacy. The workman loses when profits decline and the business goes to pieces just as much as the employer. We have seen too that high wages are not inconsistent with large profits, if the workman is not foolishly compelled to do inefficient work by trade union rules. If wages were the only factor in making up cost of production, higher wages would come out of profits alone, and the contest between labor and capital would be simply to see which could get the largest share of the gross proceeds. But with any given selling price, profits depend on two factors, wages cost and overhead cost, and the latter is governed largely by the rapidity with which the workman turns out his product. Limitation of output, even when the work is paid for by the piece, thus cuts the employer out of the ability to pay high wages. A large daily output is to the interest of both employer and employe, if both sides will be intelligent and considerate enough to recognize the fact and to pull in harmony with each other. A part or the whole of the direct gains from larger output per day—according to the amount of assistance furnished by the employer in securing it—should go to the workman, and the employer will still be a heavy gainer from the decreased proportionate overhead expense or burden on each article. But the chief reason why capital and labor so often pull in opposite directions seems to be a failure on the part of the workmen to understand the broad principles which affect their best interests as well as those of their employers. Nor can it be denied

that employers as a whole are not much better informed in this respect than their workmen.

There is no reason why labor unions should not be so managed as to be a great benefit both to employers and men. There are certain points at which the interests of the two classes must be carefully guarded by each. The employers, generally speaking, do not wish to pay any higher wages than are necessary to get the work done, and as we have seen, combination is often the only means of protecting the laborer's interests in this respect. Some employers too are not broadminded enough to see that sanitary, safe and comfortable conditions of work are an advantage to all concerned. In respect to all these points the labor union exercises a legitimate function in securing fair play and justice, which the workman would be helpless to enforce single-handed. The union has other advantages; it brings men together, and that which cements friendship and makes for brotherhood is well.

But the functions of the labor union should be extended and its usefulness vastly increased by the consideration of those points in which the interests of employers and men are identical. The unions should be open to recognition of the fact that whatever makes for greater efficiency in the business, whatever makes for lower costs of production, tends in the long run to raise men's wages and better their conditions as well as to increase the profits of the concern. Rules that lower the productive capacity of each man, that compel the employment of two men to do work that should be done by one, lowers correspondingly the value of each man's work and

puts a narrower limit on the amount of wages the employer can afford to pay. Moreover, by reducing profits it drives the business toward the rocks of bankruptcy, withdraws capital from the industry, and thus steadily decreases the demand for labor. Wise, conscientious, and intelligent union leaders should educate the other members in the true economic relations between labor and capital and compel them to recognize that there are many features in which their interests and that of their employers run together. When this shall have been done, employers and men will coöperate in increasing industrial efficiency and adding to the sum total of the nation's wealth. The unions will come together to consider methods and means of bettering the business as well as to discuss grievances; they will recognize the broad principle that the greater the daily output of the average individual in a trade the greater will be the average wages in the trade, and that in the long run turning out a large amount each day means higher wages, steadier employment, an increased demand for labor, and greater prosperity for all.

The more immediate and practical problem that confronts us concerns the best methods of treating with trades unions as they are now organized, and the relations that should obtain between employers and men. No general answer can be given to this perplexing question, because conditions differ in almost every particular case.

Wherever it can be avoided, we may say that it is a vicious practice to herd the men together in classes, pay all of each class the same wage, and offer

none of the men any inducements to work harder or do better than the average. Where this is done the laborers have nothing to gain by attaching themselves to the interest of the employer. The only thing they can do is to combine and if necessary strike for the highest wages they can obtain. That this state of affairs is far from satisfactory to either employers or men is obvious, but there seem to be many cases in which this herding together of men in classes cannot be well avoided. Particularly is this true where there is no means of measuring the amount or quality of work done by each man. Street-car conductors, for example, cannot very well be paid in proportion to the amount of their output nor according to the individual efficiency of each man. The incompetent, of course, can be discharged, but the work is of such a nature that any man of ordinary intelligence can perform it. The only stimulus that can be offered in such a case is to hold out hopes of higher pay, promotion and retirement with a pension as rewards for long and faithful service.

It is in cases like this that the trade union as it now exists finds its greatest justification and the application of union principles offer the least to criticize. When difficulties as to rates of pay or hours arise the safest and sanest method of settling disputes is by means of the trade agreement. Representatives of employers and men get together and endeavor to come to some agreement that will, if possible, secure justice on both sides.

We have seen already that if there is any possible method measuring or keeping track of the amount of work that a man is doing, more satisfactory results

will be secured. There are many kinds of work now being done by the day that can be put on piece wages, or that can at least be inspected and records kept of the amount and quality of work done. Similarly there are many trades where the wages and conditions of employment of whole classes of men are regulated by conference and agreement between the leaders of unions and manufacturers, yet where the material interests of both parties would be vastly improved by a different method, one that would pay each man in proportion to his individual worth. Where all workmen in a class are paid the same wages, each is anxious not to do any more than his neighbor; they are given every incentive to go as slow as the poorest man in the lot. Stimulate each workman's ambition by paying him in proportion to the amount of his output, without limiting him to the rate of work or the pay of the average of his class—protect him against injustice in the lowering of rates or of pay, and you have a method that will insure high wages to the men, high profits to the employer, and justice to both.

But, says the perplexed employer, my men belong to a union that strictly limits their output to so much a day; that regulates all the conditions of employment in such a way as to reduce the output and make me employ more men; that insists that none but union men shall be employed. Conditions as extreme as this are not usual, but nevertheless are occasionally met with. There are indeed situations where the union has so tied the employer up that he can but fold his hands. Yet it is seldom that all the employes of a firm are working in a closed shop, and many an

employer has made an opening wedge by introducing new and improved methods in the parts of his establishment where the men were more progressive, more open to conviction.

Even where the men are most stubborn, nothing is lost by offering one of those methods of increasing their pay which they can take or leave as they choose. It is no crime to offer the premium plan or the time guarantee plan even in a closed shop; and the most obstinate will find it hard to resist the opportunity to double their wages when assured that the increase will be permanent. When the men in the closed shop see those in another department earning 100 per cent more by accepting the new rates, their adherence to a vicious and costly rule will sooner or later begin to weaken. If in addition a man can be introduced among them who is earning steadily the higher wages, the power of example will prove too strong to resist. It is best not to make the question of membership or non-membership in the union an issue. Let them belong to the union or not, as they choose; if their union membership will not allow them to earn more than \$2 a day, and they see that it will cost them \$2 additional, it is for them to decide whether the privilege is worth that to them. In the establishments where the new art of management has been applied with most success, the men are almost never compelled to leave the union. Of course the time may and usually does come when the union rules and restrictions must be relaxed or the man who sticks to them will become but a hopeless incompetent in a shop of busy and efficient men. But if the employer voluntarily offers more than the

union can promise, the reason for its existence, except as a social factor, has passed.

Workmen who are paid in proportion to their individual worth, who are earning more than the average of their class, who are treated squarely and betrayed by no tricks or subterfuges,—these men are happy and contented, and have no use for a union if it is going to deprive them of their high wages and general well-being. The trade agreement, necessary as it sometimes is to avoid industrial warfare, is too much of a cut and dried affair to give the workmen any personal interest in their work. But when each man's personal ambition is stimulated by a proper system of pay and proper treatment by the employer, then are called into play all the factors that make for efficiency and progress.

It may be objected that the system of basing pay rates and wages on the scientific determination of standard times for work puts entirely into the hands of the employer the arbitrary fixation of many points that should be decided upon only after a conference between both sides. This objection is not very well sustained by the facts in most cases. The amount of work which a man should do in a day, what constitutes proper pay for his work, and the maximum number of hours per day a man should work—all these, as we have seen, may be scientifically determined. If the employer carries on the experiments with care and accuracy, he has then certain data on which to proceed. But there is no arbitrary fixation in most cases. The employer simply offers to pay a certain percentage above the average in return for a certain amount of work more than the average.

If the amount of pay offered is not enough, the men will not accept it; if the amount of work demanded is excessive, it will have to be changed. The time may some time come when all workmen will be expected to turn out the maximum output; but when that time comes scientific time study will have established standards that can be accepted as fair by both employer and men.

Proper treatment by the employer implies something more than strict honesty and square dealing in matters of pay and hours. There is no denying that one of the most serious objections that are met with in applying scientific methods of management arises from the fact that the determination of standard conditions of production takes all initiative out of the workman's hands. He is made to use exactly such and such tools, in exactly such a way. His every movement is mapped out for him by instruction cards and closely inspected by speed and job bosses. Though this system makes for vastly more efficient conditions of production the workman feels that he is being treated as an automatic machine rather than as a thinking, feeling human being. If he can be made to appreciate that these measures are taken in his own behalf, in order to enable him to better his condition and earn higher wages, part of the sting is removed. But it can easily be seen that there is extra need of caution here lest the workmen get entirely out of sympathy with the management and their work and become convinced that their individual rights and personal liberty may suffer encroachment. A special effort should be made to treat the employes as men; to give every consideration to

them; and even their prejudices should be treated respectfully in dealing with them.

Workmen will do more for the sake of friendship and when they are sure of sympathy and help than for money alone. We remember that one of the great advantages of the contract system lies in the satisfactory personal relations that exist between employers and men. If their foreman is a man who encourages them to tell him their troubles; who will be glad to give them his advice and even more material assistance; who likes to talk over things with them, both matters relating to their work and more personal affairs; who is always sympathetic and friendly, they will be glad, if necessary, to "work their heads off" to please him.

Above all is it necessary that men should be met and talked to on their own level by those above them. The employer who goes through the works with a superior, "touch me not" manner; who has never been known to sit down at a bench or take a machine in hand; who speaks to the men in a patronizing way or not at all, has no chance at all of ascertaining their real thoughts or feelings, or of securing their hearty support to the interests of the firm. Men who are encouraged to talk to their employers and to tell of their troubles will do far less grumbling and harping among themselves over grievances that grow in the telling. Employes would much rather be criticised by their superiors, if the "calling down" has a touch of the milk of human kindness in it, than to be passed by with no more notice than if they were part of the machinery.

Every man will have troubles and trials which,

if allowed to pile up day after day, become like pent up steam in a boiler. Grievances, talked over with fellow workmen who have similar causes of dissatisfaction and who can see things only from the same point of view, simply add to the flames that increase the pressure. The opportunity given to workmen to air their views freely and to have it out with their employers acts as a safety valve; and the employer who is a reasonable man, who listens with respect and treats with consideration what the men have to say, will secure the double service of heart and hand.

Closely related to this question of personal relations between employers and men lies the broad field of endeavor which we may call for want of a more satisfactory term, industrial betterment. Space will not permit us more than to touch upon a few phases of this subject. Plans for social betterment usually have one or more of the following objects in view:

1. The securing of more pleasant relations between employer and employe.
2. Making employes more efficient by looking after their health, housing, protection and education.
3. Making conditions of work so pleasant that workmen of the highest grade will be drawn to the establishment and induced to stay.
4. Charity or philanthropy.
5. Advertising.

It is hard to tell in any particular case just how far plans for industrial betterment will pay. Like everything else, there is a diminishing return after a certain point has been reached. Recent experiences have proved that there is also danger from too great

paternalism; not only do the men resent being coddled, petted and improved, but if given too much voice in the arrangements begin to think themselves sole managers of the concern and become more and more excessive in their demands.

Still another objection to too great outlay for social betterment plans is of the same nature as the objection to paying the same wages to large classes of men. The highly efficient workman gets no more out of free lounging rooms, lectures and so forth than the incapable and lazy. Money spent on clubs, libraries and lectures really means sharing the profits earned by the more efficient with all the rest. Oftentimes better results and more general satisfaction would have been gained if money spent in semi-philanthropic schemes had been devoted to paying premiums to the quickest and most capable workmen. It may be accepted as a rule that after health and comfort and a reasonable degree of recreation have been provided for, workmen prefer to spend their money in their own way.

The plans described below are divided for convenience into four classes. Those which may be profitably adopted in any particular case will depend on conditions.

1. Well ventilated, well lighted and heated factories will always pay. Some plants will need a fire, not because they are chilly, but to relieve the minds of employees. It may be taken for granted that the best workmen will not consider for a moment living out in a place that is unhealthy, unsafe or uncomfortable. In addition, many employers find it profitable to go deeper into the matter of health. They

provide lockers fitted out with changes of clothing, dry shoes and stockings and so on, so that the employes will not catch cold or have their minds preoccupied with bodily discomfort. Some large establishments provide a physician in attendance for the men and a nurse for the girls. The value of this method depends entirely on conditions. There is danger, for example, that men will knock off work on the slightest excuse to consult the doctor about some imaginary ailment and secure his permission to go home by exaggerating symptoms. To provide against this a bonus of from 2 to 5 per cent of wages is often given for good attendance.

On the other hand, there are some classes of laboring men and women who have the scantiest conception imaginable of the importance of taking thought for their physical well being. To do for them what they will not do for themselves will often repay many times the expense, in securing regularity of operation in the various departments of the establishment. Moreover, a nurse and physician may prove invaluable in teaching the employes to live sane, temperate, healthful lives. The first law of efficiency is health. The man or woman who comes to work in the morning exhausted from the excesses of the night before is worth little or nothing to the firm.

2. It is sometimes advantageous to care for the employes' health and housing conditions outside of working hours. Some firms run boarding houses, to make sure of sanitary conditions in the home, to prevent overcharges, and to furnish a labor nucleus in the locality. In city districts that are infested with

saloons and low drinking places, it may be worth while to provide attractive lounging and rest-rooms to prevent men from coming back to their afternoon's work half stupified from the noon-time round of drinks. The same motives may prompt the establishment of lunch-rooms where cheap but wholesome food is served. The directors of the Chicago Telephone Company not long ago provided lunch-rooms for the operators in all the exchanges in the city. As one of the officials expressed himself, when asked the reason for the change: "We had to do it. We have noticed for some time that the girls were cross and irritable in the afternoon; and we found upon investigation that most of them lunched on a combination of sour pickle and an ice cream soda."

3. Plans providing for the intellectual improvement of employes take many forms. Lecture halls and free lectures, libraries, reading rooms, courses of study at night, all these have been tried with varying degrees of success. Viewed from the standpoint of dollars and cents the objects of intellectual improvement plans are two: The first of these is to give the employes an interest in something besides dances, pool-rooms and drinking bouts, which impair their health and sap their ambition for better things. The second is to increase their efficiency by systematic training in subjects that will be of assistance in the business in which they are employed. The expense of plans of this nature is often considerable, yet they often bring surprisingly large results. A department store in one of our large cities was embarrassed for a number of years because of the costly blunders constantly made by cash and sales girls, due to a lack of

knowledge of the rudiments of arithmetic. A night school that was established failed because the girls would not attend. Finally it was decided to run the school during working hours, a plan which scored an immediate and tremendous success. The girls were glad to drop their routine duties a couple of hours every week, and as classes were not held during rush hours they were easily spared. The improvement in the accuracy with which bills and orders were made out effected an immense saving in time, trouble, embarrassment and expense.

Many concerns that have not at their disposal facilities for starting schools of their own encourage their employes to take up courses outside the establishment. A business house that employs a few bookkeepers and accountants, though it would gain considerably from greater efficiency in these employes, would experience great difficulty in providing adequate instruction in auditing and accounting. Good teachers of these subjects are hard to find, their services are in great demand, and they can command good salaries. These and many other business subjects are best taught in a school regularly organized for such a purpose. Establishments located near schools and universities that provide systematic training in business subjects are becoming keenly alive to the importance of inducing their employes to take up courses of study that will make for efficiency and progress; many of them are offering to pay part or all of the tuition of those who wish to avail themselves of the opportunity. The spread of correspondence and extension school courses is now offering the

same opportunity to those remote from institutions of learning.

Courses of study taken up outside an establishment derive additional merit from the fact that they tend to broaden an employe's intellectual view and awaken interest in a wide range of studies that a single firm could not introduce.

4. Industrial betterment plans that have for their object the physical recreation of employes are of less apparent value and bring at best a more remote return. Gymnasiums, baseball and athletic grounds may indeed be worth while in regions where no means of physical recreation are to be had. They serve to break into the bleak routine of daily toil that dulls so many lives, and to promote a kindly feeling among the men for their employers. Most communities, however, now recognize the value of parks and playgrounds, and provide facilities of this nature out of public lands and funds.

In general it may be said that semi-philanthropic plans for industrial betterment should not be made subordinate to the solution of the greater problems of work and wages. They should be regarded as means of attracting and holding first-class workmen, but they will prove of minor importance until it has first been determined how much work a first-class man can do and what conditions of work and system of pay will avail to secure the maximum output. In fact the high wages which it is possible to pay after a scientific investigation of the problem of work and wages will often of itself serve to attract workmen of the highest grade.

It is to be understood that where betterment

plans have been entered into from philanthropic motives, or for purposes of advertising, their application will be governed by rules different from those considered. As a discussion of these matters would open up a field too wide for us to cover, we must be content with this passing observation.

The subject of the relations between employer and men calls for some consideration of methods of dealing with refractory and disobedient employes. Unfortunately most firms make no systematic attempt to discipline the men; beyond "docking wages" for tardiness, "talking to" those who are bad, and discharging those who are incorrigible, no attempt is made to enforce rules and regulations. Yet it is important that the management adopt and enforce a consistent, carefully considered system of discipline, one that will apply with justice to all the men.

Most employes in a well-managed shop are anxious to do their duty, and fail rather through ignorance than through a spirit of insubordination. These men, in case of error, should be talked to in a friendly way until they understand what is required of them. Only when the employer is convinced that infringements of the rules are made wilfully should severer measures be employed. There are some men on whom talk will have no effect unless they are convinced that some definite punishment or penalty will follow. The employer can, of course, threaten discharge; and this is effective as a last resort.

But there are many small offenses that do not merit such a drastic penalty. The employer may not be in a position to discharge a man without con-

siderable inconvenience and loss to himself. If the disobedient employe knows this, he may take pleasure in sailing as close to the wind as he dares. It is desirable therefore that there should be several steps between talking to a man and discharging him, graded in severity according to the nature of the offense.

The disobedient employe's wages may be lowered or he may be suspended for a shorter or longer time. These expedients are sometimes effective, but they are often impossible because if universally applied they will certainly cause some employes to quit altogether. Laying off a man will often give the employer as much inconvenience as the man, because of machinery lying idle or work delayed. More practical is the plan of giving a bad mark for each time a rule is broken and keeping a record of these marks. If the employes know that these marks will be taken into account when questions of promotion or increase of pay come up, or when a man is asking for a recommendation, they will naturally endeavor to have as clean a slate as possible.

There are some men whom the bad mark system will only encourage to collect as many black spots as they can without actually being discharged, but such instances are rare. This system may be made more intensive by attaching a distinct money loss to each error. The merit of this is that the amount of the fine may be graduated to the severity of the offense. But there are several dangers to be avoided in adopting a fining system. First, it should not be plunged into too hastily. It may be introduced gradually, covering in the beginning only the most flagrant

offenses, and later extending to all infractions large and small. Second, it must be applied impartially and with good judgment. It is a good plan to fine foremen, managers and even the employer himself for infringement of rules. Lastly, the money collected from fines must be returned in some form or other to the men, otherwise it will be impossible to make them believe that the fines are not imposed for the purpose of enabling the company to make money. If the fines are turned in, for example, to an accident or sickness insurance fund for the benefit of the workmen, they recognize it at once as purely a system of discipline. In many plants the workmen are organized on a self-governing basis and discipline themselves.

It is to be regretted that space will not permit of a more extended discussion of many of the points that have been crowded into this one brief chapter. Experiments are now going forward in thousands of establishments in this country, each of which presents some new phase of the relations between capital and labor, each of which is testing some new principle bearing on the relative positions of employer and employed. While our literature is replete with works on the general problems of labor, very little has been written on those problems of management which concern the personal relations between employer and man. Perhaps some ambitious investigator will some day delve into this broad field and bring to light many things which are now hidden from view.

CHAPTER XVII.

SALESMANSHIP AND THE SELLING DEPARTMENT.

The work of the salesman, like that of any other member of an establishment's force, may be looked at from two viewpoints, that of the employer and that of the man. From the standpoint of the man, efficiency in his work, whether he be salesman, machinist or day laborer, has a most important bearing on his earning capacity. The first-class man always commands the highest wages. This is perhaps more true of the salesman than of any other wage earner, for efficiency receives readier recognition in this line of work than in any other. The machinist is often hampered in his desire to earn high wages by union rules that compel him to restrict his output or by faulty systems of paying wages, that make it against his interest to do more than a third-rate man. The salesman is never so hampered; no union or intimidation on the part of his fellow-men can compel him to cut down his sales record, nor need he fear a cut in wages if he does too well. The machinist or shopman is often shut out from higher earnings by the trade agreement providing for uniform wages for all men of his class; each salesman is in a class by himself, as no "union scale" ever holds him back

from demanding and receiving as much as he is worth to his employer. There is no line of work in which wages of men in the same class vary more widely. In the grocery trade, for example, salesmen receive anywhere from a few dollars a week to many thousands a year, strictly in proportion to their individual merits. For these and many other reasons a high degree of skill is more important to the man who sells than to him who produces.

The importance to the employer of having first-class men to work for him has frequently been pointed out in the foregoing pages. The man who can turn out twice as much as the average is worth much more to the employer than twice the average wage. Moreover, we have seen what great possibilities in enlargement of output and reduction of producing costs lie in the scientific determination of standard conditions of work, the best shapes and metals for tools, and the best methods of performing operations. If this is true of the producing end of a business, how much more true is it of the selling end! For profits depend, in the last analysis, on the production of orders more than on anything else. You may have the most efficient management in the world, you may have the cost of production reduced to a scientific minimum, but unless these serve as a means to the quick and efficient marketing of the product, all that you have accomplished goes for naught. It is useless to increase your output at the same cost for labor and capital unless you have a sales organization that can place your goods upon the market at profitable prices and without loss of time.

The interest of the salesman and of his employer is therefore at practically all points the same. The capable and efficient salesman is a boon both to himself and to his employer. He can earn wages as high as his abilities deserve, and the employer is the first to recognize his worth and give him his reward. What the salesman gains in knowledge and skill and ability to secure orders means larger profits in the balance sheet of the firm. The wise employer will therefore take special pains in the training of his salesmen. Important as is the training of the workmen in the most scientific methods of doing their work, the development of an efficient selling force and training of the men is even more necessary.

But while the interest of both parties is the same, the problem before the employer is a broader and deeper one than that which presents itself to the salesman. He has to consider not only the efficiency of the individual members of his sales force, but several other factors besides. He must consider the proper organization of his selling department and the training of managers as well as men. He must devise a system whereby he can ascertain if each man is satisfactorily covering his territory, getting his full quota of business, keeping old customers and securing new ones. The employer must see to it that the sales manager is employing the proper grade of salesmen, is checking them up on the business they secure, and is providing the proper methods of training them. Lastly, he must look over the whole field to be sure that the department is securing such a volume of business at such a cost for selling expense as will leave the largest possible margin of profit.

In treating this subject, therefore, from the point of view of the employer, and considered as a part of the whole field of business organization, we must of necessity come across the principles that especially concern the salesman. And if, in so doing, the subject becomes broader than a single chapter can completely compass, there is much to be gained in keeping to a logical point of view; while it must be remembered that on every part of the general subject of business organization volumes could be written without exhausting the field.

Every employer has to face the question as to the best methods of selling his products. Each business has peculiarities of its own which call for special treatment. Different methods of manufacturing, different classes of people to whom the product must be sold, different considerations of territory to be reached, all will call for variations in systems of advertising and of selling adapted to the nature of each particular case. Yet there are principles that will apply to almost any kind of business; the building up of an efficient organization, and the development of a highly trained selling force are liable to make in almost any line of business all the difference between large profits and none at all.

The well known difference in the abilities of different salesmen inclines many to the belief that scientific development of the selling end of a business is all nonsense. The generally accepted theory that salesmen are born, not made, has caused many an otherwise wide-awake business man to let his sales department take care of itself. The man who will admit that workmen may be trained to a high degree

of efficiency, who will follow the best methods of management and supervision, will nevertheless often trust chance and good luck to take care of his sales, because he believes it is out of human power to make a good salesman out of a poor one.

That some men are born salesmen, no one will deny. Some fortunate individuals seem gifted with a faculty of making other people do as they wish and want what they want. Some men have an impressive carriage and a way of saying things that makes the person addressed feel as though all the wisdom of the centuries is treasured in their words. As a manager of a selling department in a large concern once facetiously remarked, "It takes a big man to make them 'come over;' I never hire one, if I can help it, that weighs less than two hundred pounds!"

This is all very well if you can get the "big" men, and if your business is mostly with people who are easily impressed. A concern that has to do business with women, or ignorant foreigners, or unsophisticated inhabitants of regions remote from the centers of civilization may find it advantageous to lay particular stress on dignity of bearing and impressive manners. But the modern business man is not easily impressed by mere outward show. He wants to know what the article he is buying is like, in what respect it practically differs from some other company's product, what advantage there is to him in the use of this article rather than some other. Here is where innate selling ability that is not backed up by knowledge will only make for an interesting conversation, without resulting in a sale.

What is to be gained, then, by organization of a

sales force and careful training of the men? First there is the wide gulf of difference between the man who takes orders only from those who are anxious to buy and the one who, because of his skill and knowledge of his business, persuades the indifferent or the hostile to take his product. The untrained salesman starts off with a catalogue and a hazy mass of large words. He may take orders because he quotes lower prices than his competitors; and firms who pay no attention to the training of salesmen find this costly method the only way to put their goods on the market. The trained salesman may be lacking in impressiveness of carriage and a blithe flow of words; but if he knows what he is talking about he will soon gain the respect and attention of the man who "wants to be shown." And the business man today always does "want to be shown." He will listen to the trained salesman who comes to him loaded to the muzzle with all the fine points about his article, who knows all the defects and all the good points as well about the competing products, who has heard all the objections that can be raised against his own goods and who knows the best argument for each objection.

Another advantage of a proper system of training lies in the fact that the salesmen may be brought together to coöperate for the good of the company. Many firms believe in the policy of pitting one salesman against another with the idea that each will do his best to excel his fellow. This is a mistaken policy. It makes the salesmen jealous and distrustful of each other, and instead of all pulling together for the benefit of the house, each man pulls for him-

self alone and against all the others. Salesmen of long experience and training will invariably discover points and methods of forcing a sale home that should be the common property of all. Instead of sharing this knowledge with the newcomer or the less observant, they keep it for their own use. Oftentimes the most successful means of demonstrating the merits of goods are kept as a monopoly by a few good salesmen, and the employer wonders why in the world Smith and Jones cannot make the sales of Smithson and Johnson. If the policy of setting the salesmen against each other is abandoned for one that will encourage each man to impart what knowledge he has gained for the good of the concern, the selling force is in a fair way of being composed exclusively of first-class men.

Lastly, training and system may be combined to adapt the selling force to the output of the factory and to the demand for its products, and to secure changes in design that will make the article more marketable. Records may be kept showing just how much territory is covered and how well, whether competition is being met and satisfactory prices secured. Reports from salesmen may be procured showing where more products can be placed, so that any contemplated increase in the factory output can be adequately provided for beforehand. The employer may also secure valuable pointers in regard to the advertising of his goods, not only as to places where local advertising will do the most good, but also as to the features on which most stress should be laid in the advertising in any particular locality. Slight variations in standard products may often be

made with fine results, to meet the particular needs of any one region. What these needs are can sometimes be ascertained only by the man on the field, and salesmen that are working for the good of the firm will often provide suggestions that are invaluable.

An illustration of this point may prove suggestive. Not long ago the Arizona agent of an automobile company was called upon to explain why the sales in his district had been so slow. "It's tough sailing," he said. "The engines get overheated, and I can't get away from that fact. When you can put out a machine that will plough through six or eight inches of red-hot Arizona alkali in a burning sun without boiling the radiators, I'll sell them as fast as you can ship them to me." The manager saw at once that a special type of machine was needed to meet the peculiar conditions of that part of the country and made arrangements accordingly. It was not difficult to force a larger circulation through the water jackets of engines intended for the alkali country, and the machines of that company in a short time enjoyed a popularity equalled by no other. Salesmen that have been properly trained will keep ears and eyes open for possibilities of improvement; they may mean thousands of dollars to the company.

These considerations apply directly to the agency or firm that is actually engaged in putting the product into the hands of the consumer. This may or may not be the manufacturer of the goods. There are many ways by which the manufacturer may dispose of his products and the considerations adduced above will apply to him in proportion to the direct-

ness of his connection with the selling end of his business. To illustrate, we may briefly review some of the well known methods of selling.

The simplest case is that where the products are sold direct to the consumer by the selling agents of the manufacturing concern. The salesmen are paid by the company, and though large concerns may maintain branch agencies, these are all under the direct control of a central sales manager. The disadvantages that may be connected with this plan are not difficult to see. First, the company is obliged to keep on hand a large stock of goods, on which money cannot be realized until they reach the ultimate consumer. The responsibility of marketing the goods rests on the company, which must be prepared to bear all the fluctuations of prices, changes in demand, and other uncertainties of a changeful world. Then again it may be that other agencies than the company have built up a strong organization for marketing these particular goods and can do it better and cheaper than the manufacturing concern. All these points have to be considered in determining the best means of disposing of products. On the other hand, a company that sells its own products has its hand at the helm, or, to shift to another figure of speech, has its fingers on the pulse of the market. The management then knows definitely whether the territory is being covered or not, and whether adequate measures are being taken to present the goods to the consumer. Faults in selling organization and in the training of salesmen can be immediately corrected. Customers prefer as a rule to deal directly with the main office.

When questions come up as to prompt delivery of large orders, as to repairs and replacement of faulty products and the like, there is always more or less delay and uncertainty if the manufacturing company can only be reached through some separate concern that is doing the selling.

The plan of selling to separate agencies has much to commend it. In this case the agencies themselves employ salesmen and dispose of the product to the consumer, and the company is thus relieved of all the burden of maintaining a sales department. The product is sold as it comes from the factory at a definite contract price, which avoids both delay and uncertainty in the money receipts and capital loss in keeping large stocks of goods for indefinite periods. In many cases contracts for delivery can be made for the future in such a way as to enable the manufacturer to adjust the output of his plant to the demand. The merits of this plan depend largely on circumstances. The intervention of a middle-man seems to be almost a necessity in many lines of industry. The flour miller, for example, is in no position to sell his product direct to the tens of thousands of households that will use it. Marketing here demands more than the organization of a selling force; it calls for the organization of transportation, intimate knowledge of local conditions in thousands of places, the development of a system of advertising both local and national, and facilities for distribution of the product in minute quantities.

Many articles are of such a nature that the advantages of a selling department in the manufacturing company are of minor importance. The con-

sumption of flour, for example, cannot be "coaxed." The demand for it is said to be inelastic. The most that the milling concern can do is to induce people to use one particular brand of flour in preference to some other, and this is best done by advertising. Next, the manufacturers can see to it that their product is distributed so that prospective purchasers can secure advertised articles at the nearest retailers, and their work, so far as the selling end of their business is concerned, is practically done.

The chief demerit of the middleman system is that it is often difficult to make sure that the selling agency is adequately covering the ground and using all means to develop an efficient selling force. Especially is this true where agencies are given exclusive rights over certain territories. The manufacturing company very often does not come into contact with the individual members of such selling agencies, and does not know whether the methods employed are such as to secure efficient representation and handling of the company's product. Where goods are sold through exclusive agencies it is important that there be a close connection between manufacturer and seller. The company should wherever possible secure first-hand knowledge of the field and its possibilities and be prepared to establish a branch office of its own wherever agency representation seems inadequate. If this is impractical, the company should still keep its hand on the market and co-operate with selling agencies in every way. It should see that the salesmen are properly trained, and that the best methods of securing a large sale of product are installed.

Granting that the best method of disposing of the product has been determined, we come to a more minute consideration of a scientific system of training salesmen. The importance of this has already been enlarged upon, and indeed would seem to be so self-evident that every employer would recognize it, yet strangely enough very few chief executives even know what can be and has been done in this direction. Many thousands of dollars are spent in advertising, in forcing the attention of the public upon goods by concerns that pay no attention to training the men upon whom they must depend to close the orders. Thousands spent on advertising are often thrown away because of listless, indifferent, untrained and jealous members in the selling force. A highly trained, loyal and active selling force is on the other hand one of the most valuable assets a firm can have.

The results that can be secured by developing an efficient selling organization have recently been demonstrated by several of our largest and most successful concerns. Perhaps the most brilliant illustration is that furnished by the National Cash Register Company, of Dayton, Ohio. Mr. John H. Patterson, the president of this company, has presented to the world a grand object lesson in the application of many new principles of business management, chief among which stands his work in developing a trained and efficient selling organization. A number of concerns have followed his example with decided success. Nor are his principles applicable to only one line of business; they have been adapted to the conditions of many different kinds of business that require the marketing of goods or of services. The system em-

ployed has been described by Mr. C. U. Carpenter in the volume, elsewhere referred to, on Profit-Making Management, and we may in reviewing this plan, draw therefrom the clear-cut principles that make up the science of a selling system.

There are two essential features in the upbuilding of a selling organization. The place of first importance must be given to a systematic training of salesmen, but first in point of time and logical sequence comes what is called the "salesmen demonstration meetings." These meetings should be held at stated periods and frequently,—once a week, if practicable. Here the salesmen meet and in a definite program bring out the points that experience has taught them are valuable in their work. The value and importance of demonstration meetings appears from several considerations.

First, training the salesmen may occur to anybody, but there are many practical difficulties in the way of starting the system. If the men are arbitrarily commanded to start training, considerable opposition may be expected. In the demonstration meetings support and enthusiasm are secured. The salesman is not asked to do any studying at first, merely to attend the meeting and contribute what ideas he may have toward its success. Moreover he will be given the opportunity here to bring up any grievance he may have, will be allowed to discuss any troubles he may have met that are affecting his efficiency, and will be helped out of his difficulties. Again, an efficient training system cannot be devised out of whole cloth to meet the special needs that will come up in any business. The features that give greatest value

to the training system must be drawn from the discussions in the demonstration meetings. Then when the salesman starts in training, he feels that he has had some part in the development of the system, inasmuch as his own arguments are often used and his own difficulties provided for. He knows then that the training will be of practical benefit to him. The demonstration meetings so accustom him to the methods employed that the work of training is rid of its terrors.

One point that must always be kept in mind, if the meetings are to have any success at all, is that every measure must be taken to inject new interest and enthusiasm into the salesmen. They must be made to feel that their interest and that of the firm are identical. They must be induced to give up personal rivalries and jealousies for the sake of a common cause, and made to understand that they will win favor with the heads of the concern in proportion as they contribute to the success of the meetings and bring in suggestions that are valuable to the firm and helpful to the other men. They should be stirred to make a good showing in the demonstrations, and the sales manager should invariably be present to make personal observations of the value of the part taken by each man. If possible, the superintendent or the chief executive should be present at certain meetings, for it acts as a tremendous stimulant if the men are compelled to perform before someone high in authority. The presence of sales manager and higher officials will not only contribute to the success of the meeting but may provide valuable suggestions to the heads of the firm.

These meetings should not be allowed to proceed at haphazard. A definite program should be arranged, and those who are to take part should be advised before hand. While the most important and interesting part of the program will be the demonstrations and discussions of the salesmen themselves, addresses on subjects of moment will contribute much to the value of the gatherings. These matters should be so arranged as to make up an interesting program. Let us consider some of the items that may be brought forward.

After the meeting has been opened there may come an address by the sales manager or some official, dealing with some points of interest about the company's products. This should be made definite and in such a form as to impart information that will prove of value to the salesman in his next day's work. Subjects for such addresses will readily suggest themselves. New uses for the company's products; improvements in designs and appliances; description of new products and fields they are designed to fill; methods of manufacture that show the superiority of the company's products over those of other firms or over a home-made product; these and many other subjects may be made both interesting and valuable. During or after the address salesmen should be encouraged to offer criticisms, make suggestions, or ask for further information on obscure points.

The demonstration of salesmanship, following the address, should be carefully planned and aim to illustrate some definite point. It may be arranged as a little play in which one part is taken by a supposed customer and another by a salesman, while two

others act as critics. The part of customer can be taken by an old and tried salesman who knows all difficulties that must be met with and all the arguments that must be answered, while a less experienced man undertakes to overcome all the obstacles to accomplishing a sale. The appointment of censors will lead to a discussion of points brought out, first by those especially appointed to act as critics and then by the whole body of salesmen. Discussion both in open meeting and among themselves is a fruitful source from which salesmen derive much valuable information, new viewpoints, and a lively interest in the problems presented to them. The demonstration plan may be varied in numerous ways. For example, two demonstrations may be given, one by new men and one by those more experienced. In this way not only do the new men learn by the exhibition of those tried in the service, but the older men are spurred on not to be outdone by the younger. Variations can be introduced and great interest aroused by having a sales demonstration interrupted by a salesman supposed to represent a strong competitor.

The subjects of the demonstrations will vary with the nature of the business, but in all cases should have some definite aim in view. If the salesmen have a large and varied number of products to handle, each of which or each class of which presents its own peculiar problems, the demonstrations can be arranged in logical sequence to cover gradually the whole field. Oftentimes it happens that the prospective customers are not all of one class or in the same lines of business so that the methods of dealing with one set of men present entirely different problems from those

encountered in dealing with another set. In this case the demonstrations may be arranged in a series that will cover all degrees and conditions of possible customers. Not only will this plan serve to train the salesmen in methods, but it will also show them the possibilities that lie in a careful study of each customer's business, financial condition, and even of his little personal peculiarities and preferences. Hours of precious time are wasted trying to sell the wrong product to a man who really wants something, or in trying to talk up a high-priced article to a man who appears interested but who will not buy because he can't afford it. On the other hand, large possibilities of profit and commission are often thrown away through not attempting to interest a customer who has asked for a cheap article in a higher-priced product that he could and would purchase if he were shown that he would gain by so doing. Our best concerns are devoting a great deal of attention to developing highly effective methods of convincing a customer that he should purchase a higher priced and more profitable article. It results in larger profit to the concern, larger commissions to the salesman and usually in better satisfaction to the customer. For to use a well known advertising phrase, the impression of quality lingers after the price has been forgotten.

Keeping in mind these precepts, the subjects of the demonstrations may be arranged to meet the conditions of any particular case. A few are here suggested:

Selling the product to a customer with whom quality will be considered before price.

Selling an old customer a product he has not bought before.

Interesting a new and difficult customer in a low priced or second hand article.

Selling a high priced product to a man asking for a low priced or second hand article.

Selling a new product to a man who has an old one, taking the old product in exchange on profitable terms.

Selling a man who is strongly biased in favor of some competitor's product.

Selling against competition from a competitor's salesman.

Selling a product that has not before been put upon the market.

The stress that should be laid on any particular subject will depend on conditions. Where a concern plans to enter a field in which the competitor is strongly intrenched, emphasis will be laid naturally on methods of meeting arguments in favor of some other company's product. While it is never advisable for salesmen to "run down" competitors' products, the salesman who is instructed in all the features good and bad that apply to competing articles is in a position to make the most of the favorable points in his own line.

If the business is one in which exchanges for old products plays a large part, it is highly advantageous that careful attention be given to the training of the salesmen on this point. In their eagerness to close a deal they will often hastily accede to terms that actually mean a loss to the company, and the manager or superintendent may not know that drains from this

source are holding back the favorable balance on the profit and loss sheet. For this reason the manager should in such cases devise a careful checking up system that will show what becomes of old products, at what prices they are sold, and what has been the net result of the original exchange operation. Some firms make a practice of holding each salesman responsible for the profitable disposal of articles taken in exchange and hold up the commission until the entire operation has been consummated. This may be a desirable rule to enforce under certain circumstances. If there has been a tendency for salesmen to be too free about making allowances, this plan will instil the necessary caution and insure the company against dead stock. Yet this device may prove too severe. Salesmen located in territory where there is no call at all for second hand products will be held back from making many profitable sales by this rule. Then again some salesmen will make a specialty of selling old or second hand articles, and it is better to turn such products over to them than to compel a man who has a knack of selling high priced articles to be responsible for everything taken in exchange. A variation of this plan is to hold back part of the commission until the second hand product is sold, and the necessary element of caution may be instilled by making the amount of the commission for the original sale depend more or less on the price received for the product taken in exchange.

The most puzzling feature about exchange transactions of this kind is that the profitableness of such operations often varies from month to month. At one time the demand for old fashioned or slightly used

models may be active, and a generous allowance on exchanges may be made with profit. The best way of introducing a high priced article of convenience in a new market is frequently by way of second hand models. Then the tide is liable to set the other way and everybody wants to get rid of their old models in exchange for new ones. Allowance figures that were before profitable will now load the company up with unsaleable stock, and this is bound to happen unless the salesmen are kept in close touch with conditions and carefully instructed as to the terms they should make in such transactions.

One of the greatest merits of the demonstration system is the confidence that it injects into the salesman, confidence both in the merits of the goods he is handling and in himself as their representative. He learns as he could in no other way, all the superior qualities of his company's products, and all the better methods of presenting their desirability to the prospective customer. Any matters about which he is in doubt, may be brought up in meeting and discussed to his entire satisfaction. Or the point about which he feels uncertain can be made the subject of a demonstration. Oftentimes a salesman who has met with peculiar difficulties will act the part of customer against an experienced salesman with the idea of proving his contention or arming himself against a repetition of his experience. The salesman rapidly gains in selfconfidence by having to appear before his fellows and superior officers in demonstrations. His mistakes of bearing, manner, voice and methods of approach are pointed out to him for elimination, and he gradually becomes more and more certain of

his ability to do and say the right thing at the right time.

An important number on the demonstration meeting program may consist of a talk on some of the general important points of salesmanship. This, like the demonstration, should be definite and should emphasize what is important. The subjects may include:

The market for second-hand products; favorable and unfavorable terms on exchanges.

How knowledge of a customer's business and characteristics may be used to advantage. Methods of acquiring this knowledge.

The proper order in which to marshal your arguments. Methods of introduction. How to secure the prospective customer's interest. The proper time and methods of closing the deal.

What the salesman may promise on behalf of the house; cautions to be observed. (In this connection emphasis may be laid on the importance of promising nothing that the firm will not be prepared to fulfil, and of giving the house a reputation for the strictest interpretation of the precept, a "square deal.")

Importance in salesmanship of a knowledge of the business.

How to get "new business."

Importance of tact, manners, dress, perseverance and of attention to a multitude of seemingly small details that affect a salesman's personality.

There are many so-called schools of salesmanship which make a specialty of giving instruction just in such subjects as are above outlined. There is no doubt that many men have gained valuable informa-

tion and increased their efficiency by pursuing a general course of study along these lines. But in a large measure, each business is a law unto itself. The determination of the most efficient methods of selling each product will require a special study of that product and of the needs of the men for whom it is intended. The principles of successful salesmanship can be named, but for the most part they apply in a different manner to each different line of business, and must be taught with reference to that business. The importance to a salesman of knowing everything about the goods he handles, of having all their "talking points" at his tongue's end, may easily be pointed out, but a mere knowledge of this principle is liable to be without fruit unless the salesman has an opportunity to secure instruction about his special line of goods. The only men who can supply this need are those who have had years of practical experience in making or selling them. It is for this reason that we have avoided plunging into a discussion of salesmanship in general—indeed, many volumes have been written on that subject—and are endeavoring to show how the principles that are involved may be made of practical application in any line of business.

Sales talks should prove of great benefit to the men, both as to the information immediately gained by those present and as a basis for a systematic training system. The points brought forth should be taken down by a stenographer and mimeograph copies distributed to the men. In this way salesmen in distant branch agencies will be enabled to profit by the instruction. In fact, the minutes of salesmen's meetings should be sent to all the local branches with

comments by the general manager, to serve as a model for the local demonstration meetings and to keep the branches in touch with the best and latest methods and results. Needless to say, the sales manager should also insist upon receiving full reports from all the local agencies. These may provide him with information that has not, or perhaps could not, come to him from the meetings at the home office, information that will prove valuable in a number of ways. It gives him a direct line on the quality of the salesmen throughout the whole extent of the organization. Moreover the men in the most distant branches are impelled to do their best, knowing that the character of their work will come before the eye of the general sales manager. Capable salesmen may be still further spurred on by the plan of having the best men from the branches come in from time to time and give demonstrations at the home office meetings. All these features increase the efficiency of the system and bind the entire organization into a compact whole that avoids the mistakes and shares the good points of each of the units of which it is composed.

Another important feature of the regular meetings is a discussion of the individual sales records. The business of each week can be compared with that of the week before, and salesmen who have not come up to the average will be faced with the problem of explaining why, before men who know. The principle involved here is the same one that we saw illustrated in the case of the foremen's meetings, where the individual foremen were compelled to ex-

hibit their output as compared with costs before their fellows. Every man will strive to his uttermost to present a good record if he knows that his results will be openly discussed before his fellow salesmen and his superior officers. The weak and indifferent salesman is thereby compelled out and out to admit his inefficiency, while he who has made a good record stands out in high relief before his fellows and before the men who hold in their hands the rewards of merit. Promotion and higher pay are thus meted out to the deserving without arousing suspicion or jealousy on the part of the less capable, while those whose work has earned only decreased pay or discharge can find no cause of complaint.

Other matters may come up for discussion in salesmen's meetings depending on conditions and the character of the business. A most important point is that of suggestions for new products or improvement on the old. Salesmen are in a position to know better than any other the needs of the market and little points that would make their own products more saleable. Many concerns now not only invite discussion of these points, but have developed systematic plans to secure and utilize suggestions as to new products or new designs. This is done by having a "suggestion box" into which employes can slip a written outline of ideas that seem to them valuable. These ideas are given careful examination and the more promising ones are investigated. Those that prove worthy of acceptance are paid for at such a rate as will encourage all to keep ears and eyes open for new ideas that may prove valuable to the company.

Side by side with the "suggestion box" should come the "complaint box." Grievances real and imaginary should have an outlet, and prompt steps taken to rectify complaints based on a solid foundation of fact. The company thus gets a line on the employe's point of view, and may often avert fruitful sources of trouble and misunderstanding by doing away with unsatisfactory conditions as soon as they arise. Indeed, the idea of complaint and suggestion boxes may be carried out in all departments with excellent results.

Salesmen's demonstration meetings, valuable as they are in arousing interest and enthusiasm and in spurring the men on to their best efforts, do not provide all that is needed to make up a force of really first class salesmen. The instruction provided from week to week is more or less desultory in character, and while the lectures and demonstrations should proceed in logical sequence, a new man coming in find himself in possession only of detached and isolated slices of the proper selling methods. Again, all men will not need the same amount of attention; provision is necessary to take special care with the slow and backward ones. New men should have at the beginning a knowledge of the best methods covering the entire field, so that they may see the relation of the different parts to the whole and begin to apply the principles learned at the outset of their selling career. Lastly, the regular meetings do not provide systematic training for all the men in all the branches of their work. It does not insure the proper application of the best methods in the field. These advan-

tages can be gained only by the development of a strong training department.

The importance of securing a proper instructor will at once be obvious. The sales manager cannot do the work required and attend to his other duties, unless the sales force is a small and local one. The man selected should have a wide and successful experience in selling, together with tact, patience and executive abilities that will command the respect of the men.

The work of first and greatest importance is to prepare an instruction book for salesmen. The material for this may be drawn from the reports of the demonstration meetings. It will contain in a condensed form all the important points that have been brought out in the proceedings of the meetings. The instruction book should contain such matters as the following:

1. A description of each product and the uses to which it may be put, a description of the different lines of business to which each product is especially adapted, together with a thorough explanation of the arguments that may be adduced in favor of each product for each class of customers.

2. A careful analysis of the best methods of gaining the attention and interest of each class of customers. With this may be coupled some explanation of how to find out important details as to a prospective customer's business and personal traits, and to use the information so gained in enlisting his attention.

3. A thorough lining up of the order in which the arguments for each product should be marshalled, to-

gether with the best ways of closing the deal. In many cases the point between the demonstration and the "closing arguments" may be clearly defined; and in fact all the talking parts of the art of salesmanship should be carefully drawn up and as painstakingly studied as the lines in a play.

4. A list of competitor's products, with the defects and good points of each as compared with the company's products. In connection with methods of showing the superiority or greater general desirability of the company's products it is often important to show salesmen how to "get ahead of the other fellow" by little attentions to the comfort or convenience of the customer. Especially is this necessary where rival concerns are exploiting precisely the same article, which sells at a fixed and unchangeable price. In cases of this kind the man who gets the order is the one who pays special attention to quick service, to convenient and rapid deliveries, to all that makes his house, in the mind of the customer, a delightful firm with which to deal.

5. A list of objections usually put forth against making a purchase, with the answer to each one. In the demonstration meetings salesmen should be encouraged to set forth all the objections which they have met with. These should be listed and classified, together with ways of meeting these objections. The answers may be brought out in demonstrations or through discussion among the salesmen. Particularly knotty problems should be referred to the managers of the branch agencies for discussion in the regular salesmen's meetings in different parts of the

country. In this way the best method of meeting each objection that the most canny customer can put forth may be at the disposal of the least experienced salesman.

6. Methods of treating second hand sales and exchange sales. The data for these will naturally be secured from the demonstration meetings. Much attention should be given to an explanation of the best methods of selling a high priced product to a customer who desires a low priced or second hand article.

The training of the salesmen by the instructor is divided into two parts—work in the office and work in the field. A large part of the office work has been illustrated in the description of the salesmen's meetings. Each man should be made to learn the instruction book by heart, from cover to cover. Drilling in the different points of salesmanship under varying conditions should be conducted along the lines of the demonstrations in the salesmen's meetings. Each new man should be compelled to exhibit several times before the entire body of salesmen. When he is letter-perfect in his various parts and has been started out in a territory, his field training begins. The instructor should accompany him as often as the case seems to require, to note his methods. Anything that is lacking in his words, manner, or way of handling a case may thus be marked for correction. The salesman who is lacking in confidence or who falls short in one point or another can then be called back to the platform and thoroughly drilled on these features in the demonstration meetings.

This method of training can be applied both to

new men and to experienced salesmen who for one reason or another are not coming up to their full quota of sales. Wherever possible, it is advisable that men in the local agencies should receive their initial training at the home office; and when they are sent out to the different territories the local managers should give them the same attention. The instructor should also make the round of the local offices and note closely the system of training and the salesmen's methods in each one. The local managers should also from time to time be called into the home office, in order that they may by personal contact be kept in close touch with the best system of training.

It is needless to point out that the keeping of accurate records of each salesmen's work should be used to the fullest extent to inspire and spur them on to their best efforts. The salesmen's reports can be used also as a means of determining what points need looking after in the training system, and to what extent each man is covering his territory. Each salesman, as far as possible, should be provided with a comprehensive list of prospective customers. His reports should show exactly what has been the result of his call upon each customer. To this end he should make a daily report of failure as well as a report of sales, and his failure report should show why he failed to sell. Even in case of failure the salesman can note what products he thinks the prospective customer needs, so that the proper kind of advertising matter may be sent out pending the salesman's next visit.

The devising of a proper system of sales reports will depend so much on the nature of the business that we can only point out thus briefly how they may be used. Such reports are capable of being put to uses which will be of immense benefit to the business, especially when employed in connection with a system of training salesmen such as has been described. In the next chapter we shall consider how the sales reports may be used in building up an effective advertising campaign.

CHAPTER XVIII.

ADVERTISING.

Advertising may be studied from many viewpoints. It may be considered with reference to its revolutionizing effect on business. Modern advertising multiplies human wants and human desires; it makes the luxuries of yesterday the necessities of today; it creates new and undreamed-of demands, it builds factories, sky-scrapers and railroads. There is material here for a most interesting treatment of advertising in relation to the evolution of modern industrialism.

Advertising may be regarded from the psychological viewpoint. While a knowledge of the operations of the human mind is everywhere accepted as an indispensable condition of success in all branches of business, it is in advertising and related subjects that the greatest advance has been made in the systematic, scientific study of the psychology of business. It is evident that a successful advertisement must exert a strong and peculiar influence upon the brain paths of the people it is intended to reach. Good "copy" must attract the attention of the reader; it must interest him enough to hold his attention; and it must stimulate in him the desire of possession. The excitation of these different mental

states and impulses is governed by definite laws, that determine the operation of various forces upon the human mind. Certainly no one who intends to go into this matter thoroughly can safely disregard the bearing of psychology upon the subject.

The innumerable mediums employed in securing publicity and the relative merits of each could form the subject of an exhaustive study. There are newspapers, magazines and journals; there are billboards, dead walls and blank delivery wagons; there are spaces in street-cars, telegraph poles and electric flash frames; there are letters, circulars, catalogues, mailing lists,—a thousand avenues of exploitation, each of which has its use, its legitimate function, different from that of any other. No man who intends to bring his product to the attention of the public can afford not to know something about the different methods of exploitation, what kind of people they reach, in what way they affect the minds of those who see them, and what fitness each medium has to give the amount and quality of publicity that his product calls for.

As a branch of business organization advertising assumes a somewhat different aspect. It is to this point of view that we must logically confine ourselves, just as in the case of the chapter on salesmanship. The two subjects are so closely related at all points that many of the principles brought out in the preceding section may be applied successfully to problems of publicity. Moreover, just as the problem in regard to a sales organization was intimately connected with the more specific questions relating to the personal training of the salesmen, so

advertising treated as a branch of business organization will demand some consideration of the features that go to make good "copy," of publicity mediums, and of the psychological elements in successful exploitation. It must be understood, however, that in treating the subject from this somewhat restricted point of view, we can only point in passing to a few of the fields which together make up the great range of the subject of advertising.

To plunge at once into the middle of our subject, the first question that should be considered by a firm that makes extensive use of advertising media is the selection of a manager. The time has gone by when the preparation of an advertisement or the planning of a campaign can be left to one of the clerks or an office boy. A business firm that is paying for costly space in newspapers or magazines cannot neglect to use every instrumentality in its power to make that space bring in the largest returns from the money invested. With ten thousand voices clamoring at the ears of the consuming public, only a trumpet blast can hope to be heard. Advertising is too large a factor in modern business to be trusted to anyone but an expert. In most instances a large firm will find it a wise and profitable investment to employ a man who has had considerable experience in advertising matters to give this department his thought and study to the exclusion of all other activities and interests. If the employment of a ten thousand dollar advertising manager increases the annual sales of a business by half a million dollars and builds up good-will and a

clientele that assure large profits for years to come, no one can doubt the wisdom of the investment.

The qualities such a man should possess are various. First, of course, he must be a man of ideas and imagination. The value of imagination in business cannot easily be overestimated, and it is in advertising work that this faculty has its freest play. The advertiser must not only be able to devise all manner of new ways of presenting his product, but must be able to see beforehand the impression it is going to make in the mind of the reader.

Second, the advertiser must know all about his product. He must be a man who can get into the atmosphere of the factory where it is produced. He must be ready, if necessary, to live in the factory and office of the concern for a year and think of nothing else. In what other way can the writer of advertising copy secure the information and acquire the enthusiasm that are necessary to an effectual exploitation of the product?

Third, he must be a man who can effectually co-operate with the other departments, particularly the sales organization. It is from those who handle the product, who meet the public with the goods in their hands, so to speak, that the advertising manager will get his most valuable ideas. This co-operation can be made effective in assisting the work and increasing the efficiency of the advertising man. In the case of a department store that uses a page in the daily papers, for example, it becomes a physical impossibility for an advertising manager to fill it with the kind of copy that the necessities of the case require. He must therefore

call upon the heads or managers of all departments for a written statement or announcement of what each department has to offer the purchasing public on the day the advertisement is to appear. In this way, much of the physical labor of collecting data is taken off his shoulders, and he is left free to devote his energies to presenting the information in an attractive and convincing way.

A large part of the advertising manager's work is of such a special nature that the most careful and painstaking employer will have to leave a great deal in his hands. He can be checked up only in a general and indirect way, namely, by noting results, by comparing the expense for advertising with the volume of business done, "before and after." As he must be trusted to a considerable degree with the expenditure of a large sum of money, it is for that reason important that no chances be taken with man of doubtful ability.

The manager once chosen, no pains should be spared to put every department of the establishment in touch with him and to simplify his work in every possible way. He should be provided with enough assistants so that he need not be burdened by the necessary clerical work involved in the conduct of such a department. The work of the manager, which is purely creative and constructive, should not be hampered by tedious details.

We have spoken of co-operation between the advertising man and the sales force. If the selling organization is built up in the manner described in the preceding chapter, it can be used in a most effective manner to help out the work of the adver-

tising department. The problem of the salesman and of the advertiser is in many respects the same. Each must present the merits of the product to the consumer in an interesting and convincing way. The questions that each has to answer are the same; the points each has to bring out are also the same. The only difference is that the advertising man works with pen and picture while the salesman uses the media of voice and manner. Where is the advertiser to get his data, his information? Why, from the same source as the salesman, to be sure. The training of the salesman could be very aptly applied to the advertiser.

In every business there are a few special problems that have to be constantly faced. Each business has one or more wolves howling continually at its doors. In one case it will be strong competition in two or three forms; in another public prejudice in favor of old methods and old products; in another constant changes of fashion that demand the continually foresighted exploitation of the latest designs and models. The sales organization has to attack these problems as they come up; the advertiser no less. Is it competition? Where do the salesmen learn about the good points and bad points of the competitors' goods? In the salesman's training department and in the demonstration meetings. Here he learns too what good points in his own product can be used as an argument in favor of the competing article. These are exactly the points that the advertising manager wants to use in getting up his copy. Is it prejudice against a new-fangled idea? The salesmen have encountered this objection all

over the country. Demonstration meetings at the home office and in all the branches have wrestled with the problem; and one by one have been turned in impregnable sets of arguments to meet this objection. The advertiser, in getting up his copy, wants to know, first, what the worst and most general objection the consumer offers against purchasing the product. Second, what is the best answer? The salesmen's reports and meetings furnish him the desired information on both points.

For this reason the advertising manager should be an active member and take an active part in the salesmen's demonstration meetings. The salesmen's reports should give an accurate index of the kind and amount of advertising that will do the most good. Each report, whether of success or failure, should turn in data for the advertising man. A couple of lines filled out by the salesman after each call will show what points, what features, need most to be emphasized in the next copy. A thousand daily reports, each with these two lines filled out, may be made of inestimable value to a business.

What objection to buying?.....

Advertising matter as follows.....

The usefulness of these lines is obvious. They not only tell what to say in the advertisement, but often tell where and to whom to say it. It often happens, for example, that the objections of one part of the country against a certain product will not be made in some other region. To lay emphasis on the beauty, speed and noiselessness of an automobile might make a great hit in New York or Massachusetts, but would fall flat in a mountain region where

a machine's value is measured by its ability to negotiate a long, steep grade. The advertiser, by what to feature in the local advertising in each from different parts of the country, knows exactly checking up the objections to buying as turned in territory.

This principle is capable of almost indefinite amplification. For example, the product may be something that is sold both to rich and poor; but the objections of the rich man will probably be different from those of the poor one. The salesmen's reports will naturally show the financial rating of the prospective purchaser. It may be noted that the objections of the well-to-do all run in one direction, while those of men of humbler degree veer off on quite a different tack. It becomes possible then to vary the advertising and the media to meet this condition. Newspapers and periodicals that go into workingmen's homes will then carry advertisements that lay emphasis, say, on the low price of such a desirable article, while the journals that enter the seats of the mighty will convey messages in which high quality is brought forward for inspection and the price is discreetly kept out of the limelight.

In the last chapter it was suggested that all the objections commonly offered against the purchase of a product be classified. In ninety-nine cases out of a hundred the objections will fall within a few well defined classes. This classification should be made the basis of a series of strong, telling, convincing advertisements, that can be used to push effectively the work of the selling force. On his report the salesman will fill out "Kinds of product needed,"

“Date of next call,” “Advertising matter as follows.” This information should be used to send to exactly the right man exactly the kind of advertising that his case demands, at exactly the right time, that is, just before the salesman’s next visit. The last line can be made to do double service. If a sale has not been made, it will indicate the kind of advertising that in the salesman’s opinion will be most effective with this particular customer. But suppose the customer has placed an order for a low priced or second hand product, but the salesman did not quite succeed in persuading him to buy a higher priced article. The idea of purchasing the more expensive product has been artfully presented to the customer; the salesman passes the word to the publicity manager on his sales report; and the customer is bombarded with literature containing every argument that can be devised to make him desire a better product. When the salesman calls again, if there is such a thing possible as “raising that customer up the line,” as it is called, an order will be placed for the higher priced and more profitable product. The wise advertising manager, acquainted with the methods of training the salesmen on this particular point, will have circulars, catalogues and a “follow up” system designed especially to meet such a case.

The advertising man should in all cases make every attempt to check up on his system. He should encourage suggestions at all times from the salesmen; frequent discussions in the demonstration meetings in regard to the results of different publicity and advertising devices will give a very clear idea of their value and bring up points worth noting

for improvement. The salesmen are the ones who have their fingers upon the pulse of the consuming public, and they can tell at once whether that pulse is quickening or slowing down. The effect of any publicity device upon any class of customers will be noted by the sales force first of all.

Coming down to the narrower question of making out "copy," the advertiser again should make use of the knowledge and experience of the salesmen. An advertisement, as we have seen, must on the whole present the same arguments to the customer, the same reasons for purchasing, as are used by the salesman. There are, of course, many features that must be determined by the expert knowledge of the advertiser. Not all advertisements are "reason why" statements. The value of artistic illustrations, bill-board posters, a single name in big type in a newspaper, electric signs and the like fall outside of the salesman's experience. But outside of these devices, which are after all only designed to get the name of the product or the firm before the public eye, the only effective advertising is the kind that makes people want to buy, and this kind must contain "reasons why." The salesman is the one who knows why. That is his business. The advertiser should consult the best and most successful salesmen in getting up his copy. We cannot insist too strongly that advertising is a form of salesmanship organized in a different way. Its scope, its power and its usefulness lie along the same grooves as salesmanship.

What is good advertising copy? To answer this question, even briefly, we must consider for a

moment the place of an advertisement in the reader's "field of consciousness," as the psychologist puts it. The advertiser in a magazine or a newspaper is an interloper. He is no part of the supposed original plan of the periodical. He forces his way into the field with his more or less alluring pictures or statements when the reader is supposed to be solely engrossed in stories of corruption in high places or accounts of an ex-president's experiences in unknown lands. And just because he is a mercenary intruder, the advertiser must be the most skilful, the most adroit, and the most entertaining of all the contributors to the magazine or daily.

The modern magazine must fill its reading pages with live topics of current public interest. To secure circulation it must compete with a thousand other magazines that are striving each to attract and hold the largest possible number of readers. The day of the old time magazine, that contained nothing but poetry, literature and long drawn out, slow moving romances, is past. The periodical of today disseminates news and information on the latest topics, written in a catchy, interesting style. Just as the newspaper or magazine must hold the attention of the reader away from other competing periodicals by the liveliness of its reading matter and style, the advertiser must win the reader from the main body of literature or news by being more artistic and more attractive than the more legitimate writers. He must win out in a competition raised to the second power. He is pitted against the scholar, the story writer, the essayist, the artist. He must turn out better material than they do; his sentences must

be more pithy, more to the point. He has the attention of the reader but for a moment; and as a mercenary intruder he must be more skilful, more forceful, more pointed, more convincing, than any of the other writers or artists.

The same rule holds good for advertisements sent out in the form of circular letters, folders, bulletins or catalogues. If the advertiser is sending material of this kind to a man who is already interested in the product (someone, let us say, who has written asking for information) he is at liberty to go somewhat into detail. Otherwise the circular letter or folder is an intruder of the worst kind. The reader of a magazine or newspaper admittedly has given himself at least a few minutes of leisure, and will regard with a certain amount of indulgence an attempt to take up a moment of his time. Matter coming to him through the mail may knock at the threshold of consciousness when his mind is filled with a thousand business cares and worries. An advertisement of this kind must really be a work of genius. In the face of almost insuperable obstacles it must be so constructed that it will arouse the interest and curiosity of the reader to such an extent that he will at least save it and later send in a request for descriptive matter pertaining to the commodity advertised.

In a certain sense we can apply no clear-cut rules to determine the value of advertising copy. Everybody knows that a good advertisement must be snappy, interesting, sincere, convincing, natural, to the point, and so on down to the end of our list of commendatory adjectives. Yet these adjectives, one,

two or many, form no absolute criteria. In the last analysis often the best plan is to set the copy before an unbiased friend and note what his first comment is. If you have copy intended to sell mineral water and he says "What a pretty girl—who drew the picture for you?" you are on a blind trail. If he says, "That makes me thirsty!" get the copy to the publisher at once. That advertisement will sell mineral water.

Remembering, however, what advertising copy must do: that it must compete with the best magazines and newspaper literature, must steal into a man's consciousness ere he is aware, must "creep and intrude and climb into the fold," we can find certain methods of judging whether it accomplishes its purpose or not. It must attract attention, it must hold attention long enough to let at least one idea sink in, and it must convince the reader that he really wants the article advertised.

To attract attention as the first requisite in a good advertisement—that is easy to understand. The reader must be lured or pulled or pushed away from other matters that are occupying his mind. Unfortunately, many advertisement writers get this far and no farther. It is easy to attract attention. A picture of an alligator standing on its tail will drag a man from an editorial on "Who discovered the pole?" Even the novice in word juggling can compel a flash of attention by heading his copy "YOUNG MAN!" But it is one thing to attract attention, to amuse, to entertain, with clever pictures, verses, or stories; and quite another thing to

interest the reader in the article advertised and create in him a new want.

Not many years ago, when the craze for breakfast foods was at its height, the country was flooded with verses and pictures designed to attract attention to different varieties of cereals. Far the greater part of these got no farther than to awaken a smile of amused interest. Comparisons and criticism of course are invidious; but by this time most of the companies that have not gone to the wall have turned from the error of their advertising ways and will gladly lend us the value of their example for the good it may do to others.

Many of us remember the picture of the tall thin man and his short, fat companion fussing anxiously about an automobile. A bit of verse attached explained the picture as follows:

“Tim Tall, Sim Small an auto bought,
Wore caps and smelt of gasoline;
It did not bring the health they sought,
’Twas Savor saved them, no machine.”

Both picture and verse were catchy, entertaining and amusing to the highest degree. Used as a device at the beginning of a long advertising campaign to fix the name of the cereal in the public mind it would have served its purpose. Isolated and alone, it had no actual selling power. It did not persuade or convince the average man that he should buy the product advertised. It made people laugh, not buy. No one could take it seriously. It would not stand a chance beside an advertisement with an earnest

and sincere message burning through it, no matter how crudely the idea was expressed.

Another cereal advertisement repeatedly pictured a very "sunny" and vapidly amiable old gentleman with large spectacles on his nose. He certainly attracted attention; for awhile his name was on every tongue. Verses and pictures added materially to the entertainment and amusement of an all too serious world. But after all, did the advertisements contain any reason why this particular breakfast food was better than any other? Was there anything to show that the cereal was not made of cornhusks or sawdust? Did the reproduction of that sunny face, suggestive of intellectual vacuity and physical decrepitude, convince anyone that this food would give health, strength or other desirable benefits to the consumer? In the measure that it failed to accomplish these results it fell short of being the best kind of an advertisement.

That is not to say that the advertisements described accomplished nothing. They did let people know that products of certain brands existed. A man who had already contracted the breakfast food habit and liked to experiment around with different kinds might remember the name mentioned in the little jingles and find it on the tip of his tongue the next time he entered a grocery store on pabulum purposes bent. Thus a certain number of sales would be effected from merely advertising the name, which would not occur otherwise. But on the whole the effect is entirely different from that of an advertisement planned with the specific purposes of creating a new want, of convincing the consuming public

that it wants this particular product, of telling enough about its merits to arouse a desire to purchase.

Many advertisements, in fact, that can be severely criticised from one point of view or another, are entirely satisfactory when considered with reference to the effect it is desired to produce. The public must first know the name of the article exploited, and on the principle of putting out just one fact at a time and ramming it home, it may be a very good plan to start a campaign on a name alone, following it up later with convincing "talking points." This is particularly true in cases where the name is a valuable asset, that will attract attention from its mere repetition. Many instances of this will occur to everyone, ranging from much needed soda biscuit to the Crackadura cigar. The principles involved in advertising are well illustrated by these two cases. Both started out with extensive "name" copy. The plan of the cigar campaign was possibly the most spectacular. For perhaps a week or more one was met everywhere by the single word "Crackadura." Nobody knew what it meant and everybody was asking and wondering. The exploiters of the product were cleverly playing upon human curiosity. Then followed a series of half hints, giving everybody a chance to guess. "Crackadura, a spasm of delight for men," "Crackadura and a cloud of joy," furnished topic for wonderment, conjecture and argument. When the cigar came out and declared itself to the world, the smoking public rushed up with their nickels.

Now undoubtedly that particular cigar had some-

thing to commend it besides the name. There were probably several good "talking points" that could have been used to build up a series of convincing advertisements and that would have assured it a steady trade. What the exploiters did, however, was to keep playing with the name alone. "Crackadura, get the habit," "Ditto, take one home with you," went the rounds, until people got tired of the name. Seeing it associated with nothing but a lot of inane phrases, even the regular smokers ceased to read the advertisements. They carried no conviction. Failure to follow up "name" copy with "reason why" copy quickly resulted in the disappearance of the nine days' wonder from the public mind and from the dealers' stands.

In the case of the needed biscuit, "name" copy was first exploited, perhaps less spectacularly but certainly as effectively, as in the case of the cigar. Every device known to advertising science has been employed to keep the name before the public. After awhile this was accompanied by effective "reason-why" copy, and latterly the "talking point" feature has predominated over devices intended merely to remind the reader of the product. The public is told that the product is put up in air-tight, moisture-proof packages; that it is scientifically clean and wholesome; that it will not absorb the odors and flavors of other articles in grocery stores; that it is so crisp that it will crumble in the fingers. People ask for that product because there's a reason.

While it is obvious that spectacular "name" copy alone cannot build up a steady demand for the product, we see that it often serves a useful first

purpose in bringing the product prominently before the public mind. It may serve other purposes also. Extensive advertising of an original and startling character will lead dealers who handle such goods to carry big stocks and push the brand, even though the "copy" is not of a kind that induces purchases. Retail dealers are not as a rule skilled in the science of advertising, and do not distinguish the convincing advertisements from those which merely attract attention, amuse or entertain. They will stock up with anything which is kept before the public eye, and once the goods are on their shelves will make special efforts to sell them. For this reason, advertisements which are designed solely to attract attention often serve a useful first purpose. But unless this is followed by convincing salesmanship advertising there will be no steady demand for the product, and the first order from the dealer is liable to be the last.

The result above mentioned may be all the advertiser intends. Very often, indeed, the sole purpose of extensive spectacular advertising is to get the product widely talked about, secure a first rush of orders for the goods, and give the impression that the company is doing an enormous amount of business, with a wonderful future before it. This influences the public to set a high value on the stock or securities of the company which is manufacturing the product. The effect of a big advertising campaign on the securities of a corporation is a consideration not to be overlooked. Unfortunately, this device lends itself to fraudulent practices. Many a new company has been organized ostensibly to man-

ufacture, but really to advertise. Once started, it launches forth on a spectacular campaign similar to that of the Crackadura cigar. At the proper point the insiders sell out their stock to the unhappy public at high prices, after which neither product nor company is heard of again.

Again, there are products of such a nature that they cannot very well be advertised on the "reason why" plan. In the case of a soap or washing powder about all that can be done is to ring in every possible variation on the "attract attention" system, for there is not very much in the way of convincing or persuasive argument to be offered in behalf of the product. A catchy name or a fetching trade mark will, if the advertisements are varied and original, prevent people from passing by the illustrations and verses. Everyone remembers the "Spotless Town" article. There was no "reason why" copy there because there was practically nothing to be urged on the subject. To argue with a housewife that she ought to keep her house clean would be an insult to her intelligence, if not worse. Such a series of advertisements would be faulty if designed to trumpet the merits of a new vacuum cleaner process, but in the case of an old and well-known product they accomplished about all that they were intended to do or could do, namely, kept the article in the public mind. More recent is another series of pictures by the same company designed to the same end. For example, there is a drawing of an opossum walking along the limb of a tree, with the legend "You can't play 'possum with —." This is an extreme example of "attract attention" advertising, in which

the picture bears not the faintest relation to the article exploited. Of course the space so taken up would be quite valueless to any company whose product is not as well known as the one in question, but in this case only a reminder is necessary, and the originality of the picture will cause people to look at it who would not even glance down the most clever persuasive argument copy. From the nature of the case, the best this company can do is to say, with as many variations as possible "We are at the same old stand, making the same old product. Don't forget us."

Another company that is in the same boat illustrates very well the value of a clever trade mark. Whenever you see two jet black twins industriously scrubbing away at something, you are immediately reminded of a certain washing powder. Now the value of a trade mark is not always obvious. True, when it is employed over and over again in all advertising, it is not easy for the reader to escape the product at the first glance. If the intention of the company is merely to remind the reader, this is all well and good. But suppose the trade mark is accompanied by clever, convincing copy; the question then arises, will not the reader merely glance at the well known name or picture, and recognizing at once the product advertised overlook the clever copy and turn over the page? The purpose of a trade mark is primarily then to serve as a reminder. If the advertisement is intended to educate and to convince, the trade mark should not be given too prominent a place or in any way emphasized too strongly. In the case of the famous "—— ——— twins," the

trade mark is particularly valuable because it illustrates the one use to which the product can be put, it is capable of infinite variety, and serves excellently the one advertising purpose which the nature of the product allows, that of reminding the reader of its continued existence.

Yet, when one thinks of it, how small is the class of commodities that can be used for only one purpose, that have no points of difference to distinguish them from competing products, concerning which no arguments can be made, no convincing "reasons-why" formulated, no new wants created. Count over the list of such things and see how many you can find. Then turn to the pages of some big magazine and examine the advertisements carefully. How many of them upon close inspection have no other purpose than to announce a name or a trade mark, to let the reader know such a product exists? Could you, if you were writing an advertisement, suggest for many of these articles a line of copy that would secure for them something more than mere publicity? Probably on the list you have made of commodities that seemingly cannot advertise tellingly and convincingly are such homely articles as soap, sugar and lamp-chimneys. Soap has long been considered as almost hopeless in this respect, yet there is at least one soap company that has begun to try for more than mere "reminder" advertising. It has found reasons why its soap is to be preferred above any other, and is devoting whole pages to pointing out these features of superiority. Their soap floats; it is pure; it washes fine laces without damage; it is free from a dangerous proportion of alkali; it gives

more cleansing for the money than any other soap. That company is selling its soap because people are convinced they want it and will take no other.

Sugar certainly seems to be an unpromising subject for advertising. There is no competition because one company controls the market, so there is no need to argue for one brand of sugar in preference to some other. The only object of advertising would be to increase the consumption of it by showing some new uses. Evidently the sugar trust believes there is something in this idea, for we have attractive pictures showing dainty lumps of sugar tumbling out of a box. This case illustrates also one form of advertising designed to interest those who have hitherto used a low-priced article, in a higher priced and more profitable product.

At least one man has decided that even lamp chimneys are capable of persuasive and convincing advertising. This man has got up some very salesmanlike copy without using pictures or catchlines to attract attention. In print about the size of the type on this page appears something like the following:

A lamp chimney is a small matter to make so much fuss about.

There would be no need of fuss if I could only impress on the American housewife's mind that _____'s lamp chimneys give more light, almost never break from heat, fit the lamp, and avoid that sickening lamp odor.

Don't be fooled, my name is on it if it's a _____.

Illustrations like these could be multiplied almost indefinitely, but would only go to show more clearly that there is almost nothing made about which mere "reminder" copy is the best that can be done. To determine whether "reason why" copy can be made up, the following tests should be applied to the product, and considered carefully in making out advertising copy.

1. Does it satisfy a new want? Is there any way in which it can be applied that will satisfy a new want? What are these wants, and if they do not exist, how can they be created? An example of advertising based on this consideration is that of a noted linament, which showed pictorially how the product, usually associated solely with bruises and sore joints, could be used to cure neuralgia, catarrh, and even headache.

2. Can it take the place of some old product and do it better or cheaper? The makers of a powdered ammonia have educated housewives pretty well to the advantages of their product over the liquid form.

3. Is it different from competing products, in outward form, uses, or methods of manufacture? Such of these points as should be of interest to consumers will give abundant material for reason why copy.

4. Can any argument be put forward on any ground whatever, as to why this product is superior to any other, or why the customer should buy it? If not, has it any excuse for existence at all?

5. Can a higher-priced product be made and a demand created for that?

Remembering, of course, that there are certain

conditions under which mere publicity is all that is desired, the ordinary straightforward advertisement must be based on reasons why. Most products cannot be sold simply by printing a picture of a beautiful woman, an amiable clown, or a hundred thousand trade marks. The consumption of a product rests upon intelligent selection, which can only come from a knowledge of the product and what it will do. In the case of a certain brand of beef extract, for instance, you have to tell people why they should eat it, and to tell them why they should eat it, you must tell them how it is made, what it is made of and under what conditions, and why it will be better for them than any other brand of beef extract.

Many instances could be cited to show that the most successful firms are turning away from "attract attention" pictures and getting down to business with straight-from-the-shoulder, "reason-why" advertising. The house of the "57 varieties" once seemed to favor pictures of a handsome young woman with an agreeable clerk showing her some of the fifty-seven. Look in the magazine nowadays and you will find some very strong and convincing talk about ketchup and benzoate of soda.

Some of the members of what may be called the old school looks upon "reason why" copy as a sort of long drawn out story that goes thoroughly into the merits and talking points of the product, like the catalogue of an automobile house. It is supposed to present a striking contrast to the strong lines of display advertising. This is a wrong conception. "Reason why" copy may be as short, as snappy, and as effective as you please. It is to be contrasted

rather with what we have termed "name" or "reminder" copy, which is designed merely to attract attention to the product without giving any convincing arguments in its favor or any reason why it should be bought. Copy for a food advertisement that makes the mouth water, that is so put together as to make the reader long to gratify a taste for that particular food, is "reason why" copy, no matter how few are the words devoted to a description of the article.

On the other hand, many long-winded advertisements that seem at first glance to be filled with convincing arguments fail to show any reasons why the reader should purchase the product advertised instead of any one of a hundred others. Thousands of automobile advertisements serve merely to create in the reader a desire to indulge in the pleasures of whizzing over country highways, without giving any reason why they should gratify this desire in the particular machine advertised. Copy of this kind serves no other purpose than to remind the reader of the name of the product. If some other article can be substituted in place of the one intended, the advertisement will create as much demand for a competing article as it does for the company's product.

It is obvious that not all the reasons for a particular commodity can be crowded into a single advertisement. The human mind is so constituted that it will not grasp firmly more than one or two ideas at a time, especially in the limited time that an advertisement can be expected to hold the reader's attention. It is better to hammer home two or three reasons each week or each month than to bunch all the

reasons together so that none of them sinks in. Energy that is concentrated in one direction brings results. The man who goes out shooting with small shot covers a larger area, but he brings down no large game.

Advertising that only attracts attention has few uses; it is not the kind that develops real selling horse-power. It is at the service of the man who aims at notoriety, celebrity, popularity. Publicity that aims to build up trade must be constructed along different lines. This sort of publicity calls for a clear and lucid statement of reasons why a certain product should be preferred over other products in its class. It is persuasive, argumentative, convincing, educational. Advertising of this kind, supported by the vigorous co-operation of the selling organization and of all the departments, is one of the strongest assets a business can possess. It will tide a concern over hard times and carry it safe through the severest financial storms. It is the vital force that can be depended upon to keep moving the machinery of business organization.

QUIZ QUESTIONS

CHAPTER I.

Historical Survey of Forms of Industrial Organization.

Pages 11-43.

1. What wants of mankind have given rise to parks, art museums, gambling houses, diamond mines?
2. How does the labor of building an ant hill differ from that of making a bird's nest?
3. Under the housework system, what products would naturally be first exchanged?
4. Name some survivals of the help and hire system.
5. Explain the rise of the handicraft system.
6. Why should the growth of towns further the handicraft?
7. In what capacities did the handicraftsman act as workman, capitalist, employer and merchant?
8. In what way did an apprentice differ from a member of the help and hire squad?
9. In what ways did the guilds become exclusive?
10. State the chief object of craft guild regulations. How do they compare with the rules of labor unions nowadays?
11. How did the guilds secure monopoly of the town market?
12. How was permanence of subsistence secured; equality of earnings?
13. What was the attitude of the guilds toward new inventions and new processes? Is their attitude the same as that of labor unions today?
14. What were guild regulations as to prices, time, condition and place of sale of products?

15. What services did guilds perform for town and nation?
16. On what depended the permanence of the handicraft system? Can men remain for a long time industrially and socially equal?
17. What parts of the guild organization gained predominance over the other parts, and why?
18. In what respects did the domestic system differ from the handicraft guild system?
19. Why is it sometimes called the commission system?
20. Name three kinds of master craftsmen and define their economic position.
21. For what reason might the small master lose his economic independence?
22. Trace the rise of the factory system out of the domestic system.
23. What features make up the factory system?
24. Compare the factory system with the preceding forms of organization from the point of view of the workman? Of the capitalist? Of society in general?
25. Trace survivals of all types.
26. What conditions brought out the so-called business man?
27. Should a business man take a partner? Why or why not?
28. Explain joint stock, limited liability, perpetual life.
29. Disadvantages of a corporation.
30. What is its value to society?
31. What factors should be considered by the modern business man in determining how he shall use his talents and his capital?

CHAPTER II.

Efficiency of the Working Force; Division of Labor.

Pages 45-61.

1. What is the relation between the cost of labor and cost of production?
2. Do high wages make high prices? State some instances in which they do not.

3. In what ways is the employer interested in the productive efficiency of his employees?

4. What is the greatest factor in increasing the productivity of labor? What other factors can you name?

5. In what ways will division of labor increase the workingman's efficiency?

6. In what way does the use of machinery affect the principle of division of labor?

7. What is meant by territorial or geographical division of labor?

8. What factors effect the localization or grouping of industries?

CHAPTER III.

Limitations of the Division of Labor.

Pages 62-69.

1. How is division of labor effected by the size of an industry?

2. What kinds of products offer larger scope as to the application of this principle?

3. Give a list of products in the manufacture of which the principle of division of labor is difficult to apply.

4. What is the benefit to the workingman of the division of labor; to the business man?

5. What is the part of the manager in increasing the efficiency of the working force?

6. How is the organization of its labor force related to the efficient management of the business concern?

CHAPTER IV.

The Large Business and the Small.

Pages 71-85.

1. What caution should be observed in enlarging a small business?

2. State some of the advantages of large scale production.

3. What is meant by standardization of industry?

4. What advantages accrue from the use of standardization?
5. What economical gain is there from mere bigness?
6. What causes may prevent a small concern from expanding successfully into a large one?
7. Why should the profits of a large concern be greater than those of a small?
8. Name some industries in which the small concern is seriously handicapped.
9. Why are textile factories not as large as steel plants?
10. What restrictions do local conditions place upon the size of an establishment?

CHAPTER V.

Internal Organization; Defects of Ordinary Types of Management.

Pages 87-131.

1. What is the central object of the study of business management?
2. What place has personality in the organization of a business?
3. What is the place in business of scientific organization?
4. What is the danger of general principles that are supposed to apply with invariable success? Name some pet theories that have failed.
5. What is the value of system? Give an instance of system carried too far.
6. Can any general principle be applied to organization?
7. What is the value of organization? Of authority?
8. In what ways should responsibility be limited?
9. Explain what is meant by tapering authority.
10. What is the value of discipline?
11. What is the value of records and statistics?
12. What is the value of esprit de corps?
13. What is the attitude of the workmen toward a small employer? Toward a large corporation?
14. How should these factors of business organization be applied in individual cases?

15. What is the typical form of business organization in this country? Why?

16. What advantages accrue from applying our principles of organization to a typical form of industry?

17. What is the most general fault of the customary system of management?

18. In what kinds of work is the military form of organization the best?

19. In what kinds of business should other than military virtues be emphasized?

20. What features should be emphasized in an industry where there is very close competition as to quality and price?

21. What is the antithesis to military management? What is its most prominent feature?

22. What men and functions will an ordinary typical business comprise?

23. How may the efficiency of all departments be brought up to a uniform standard in both types of management?

24. What are the benefits of coöperation between superintendents and foremen?

25. What duties and responsibilities rest upon foremen? Upon what basis are foremen usually selected? How should they be selected?

26. What faults are often present in the workmen, and why?

27. What defects are to be found in handling the materials of manufacture?

28. What is needed to secure economical handling of machines and men? Give an illustration of scientific experiment in the economical handling of an ordinary laborer's work.

29. Name two defects often found in a buying department.

30. How would you begin to build up a satisfactory buying department? What is particularly to be avoided?

31. Why should the purchasing accounts be kept separate from those of the receiving or storing room?

32. What should be looked for in the sales department? Why should salesmen be trained?

33. What steps may be taken to remedy defects in organization?

CHAPTER VI.

Military Organization.

Pages 133-159.

1. Describe the features of a military organization.
2. How does an industrial army differ from one organized for warfare?
3. In what measure may the element of time affect the organization of an industrial concern?
4. Give three illustrations showing that lengthened processes make for cheaper cost of production.
5. In what lines of business is speed of operation of more importance than low cost of production?
6. Name some of the advantages of a military type of organization.
7. What should be the first consideration in adopting improved plans of management? What opposition may be expected from the foremen and superintendents? From the workmen?
8. How may the support of foremen be secured? Describe the organization of advisory board.
9. Describe the work of such a board in training foremen.
10. How may progress on new ideas be checked up?
11. What is the value of reports on daily routine work?
12. What matters involving the personnel and discipline of workmen should come before the board? How should they be handled?
13. Describe the advisory board system in a large organization.
14. What duties should fall to a main advisory board in a large concern?
15. Describe the matters that should be considered by a sub-council in the advisory board system.

16. Why is it important to enlist the support of job-bosses?
17. What is the value of foremen's meetings? What matters should be considered in such meetings?
18. How may responsibility for plans projected be registered?
19. Enumerate the advantages of the advisory board system.

CHAPTER VII.

Functional Organization.

Pages 161-183.

1. What is the greatest weakness of the military system as regards economies of production?
2. In what lines of business is cheap production of minor importance? When should specialization of departments and of labor give way to other considerations?
3. In what lines of business is low cost of production of most importance?
4. What features should be emphasized in the management of production of the following: Chairs, snow-shoes, pianos, sewing machines, parlor cars, hay-wagons? Give reasons for each.
5. Using the principle of the division of labor as a basis, explain the superiority of the functional system over the military organization.
6. Given foremen of high natural ability with the military system, will the economies of production be as well realized as with the functional organization? Why, or why not?
7. Describe the duties of the ordinary foreman.
8. Enumerate the qualities a good foreman must possess.
9. In functional management, what duties of the foreman are removed from the shop entirely?
10. What arrangements for fixing responsibility are found in functional management?
11. In what way do orders sent out from the executive reach the men in functional management?
12. In what way is the grouping of the workmen effected?

13. To whom is the workman responsible in functional management for (a) good workmanship, (b) speed, (c) good behavior?

14. What is a functional boss and what is his relation to the men under him?

15. Describe the work of the "gang" boss.

16. Describe the functions of the "speed" boss.

17. What qualities must the "inspector" have?

18. What are the duties of the "repair" boss?

19. Describe the duties of the "order of work" or route clerk.

20. In what way does the "instruction card" foreman relieve the ordinary foreman of clerical duties? The "time" and "cost" foreman?

21. In introducing functional management, what cautions must be observed?

22. In changing to functional management what parts of the system should be first introduced, and why?

23. State specifically the advantages that functional management has over other types.

CHAPTER VIII.

The Office and the Departments.

Pages 185-207.

1. What is the relation of the office to the producing departments of a business?

2. In what way does the type of organization affect the functions of the office?

3. What purposes are furthered by the securing and filing of reports?

4. Enumerate the items that should go into the factory reports? Sales reports? The sales estimate report?

5. What is the purpose of an analyzed profit and loss statement?

6. How can the cost reports be used to advantage?

7. What delays or losses may arise from not analyzing orders?

8. What items should an analysis include?
9. What is the relation of the office to standard time study for machines and men?
10. What are the duties of the "balance clerk"?
11. Of what importance is the system of identification of parts?
12. What useful purposes are served by an experiment or test department?
13. Give an illustration of the work of the test department in enabling a concern to meet competition?
14. Describe the duties of the man who is in charge of the maintenance of the office organization.
15. What uses can be made of the tickler? What are the chief advantages of the tickler system?
16. What are the functions of an employment bureau?
17. What provisions should be made for rushing through special and rush orders?
18. Does an increase in the proportion of non-producers mean greater cost of production, and why?
19. Speaking generally, what proportion should obtain between producers and non-producers (a) in a saw-mill. (b) in a printing establishment, (c) in a department store?

CHAPTER IX.

Scientific Standard Times for Machine Work.

Pages 209-236.

1. Should tools and appliances be left to the workman's individual taste?
2. What arguments could be adduced for and against this contention?
3. What is gained by the standardization of tools?
4. "It is better to have all appliances of second grade, than to have them mainly first with a few second and third class tools thrown in." Explain.
5. Give a concrete illustration of the unwisdom of allowing workmen to select their own tools.
6. Why is there no additional expense involved in employ-

ing a skilled mechanic to tighten belts and care for machines?

7. Why has the ordinary foreman small knowledge of what the possibility of output is in his department?

8. Give as well as you can the variables that would enter into the determination of standard times of some machine work with which you are familiar.

9. What practical problems present themselves in making a practical use of standard times?

10. Explain the uses of the instruction card.

11. Draw up an instruction card of some machine work with which you are familiar.

12. What problems must be met in securing the support of foremen to standard scientific machining?

13. Outline a method of procedure in introducing standard times in an old established shop.

14. On what grounds may the opposition of the foremen to new methods be justified?

15. What provisions should be made for carrying on experiments to determine standard times?

16. What points should be emphasized in introducing new methods to the foremen and other workmen?

17. What parts of the process not included in the actual machine operation should be given careful attention?

CHAPTER X.

The Expense of Wasted Time.

Pages 237-261.

1. In what ways does time wasted mean expense?

2. Give in outline form the points of wasted time in some machine operation with which you are familiar.

3. How may we determine whether a workman is most efficiently employed or not?

4. In what way does the principle of the division of labor help us to answer this question?

5. What is the first criterion in determining whether a workman is using his time most effectively or not?

6. Make out as large a list as you can of the things the ordinary workman will do that means wasted time?

7. What is the difference between a busy shop and productive one? Why are workmen often willing to be "busy" but not productive?

8. Take the list of things which mean wasted time and indicate for each item how the wasted time may be eliminated.

9. In what ways may economy of material be secured?

10. Indicate the advantages of boxes for holding tools and materials.

11. What use may be made of low tables or benches?

12. What disadvantages besides the wasting of time arises from allowing workmen to grind their own tools?

13. In determining standard times for assembling or skilled handwork what factors are to be considered?

14. What principles should be most emphasized in considering the organization of men employed in assembling and fitting work?

15. What is the object of classifying such work?

16. How may the points of wasted time be determined in the case of skilled workmen?

17. Name some of the small details essential to rapid and efficient manufacture.

18. What is the importance of having parts arranged in logical order?

19. Why is it impossible to secure in hand work the accurate results derived from a study of machine operation?

20. What factors of wasted time can be eliminated without expense for new tools and equipment?

21. What data is necessary in starting a campaign of reform?

CHAPTER XI.

Efficiency and Wages; Day Work.

Pages 263-291.

1. What special consideration from the laborer's point of view must be borne in mind in determining a system of paying wages?

2. What is the danger of introducing changes too radical in their nature?
3. What are the advantages of accelerated production to the manufacturer if wages increase in exact ratio?
4. How should the manufacturer attack the problem of the excessive cost of production?
5. Why is the tendency to "take it easy" strongest in day work?
6. Explain the paralyzing effect of herding men in classes and paying them a uniform rate per day.
7. How does the "lump of labor" theory help to retard production?
8. What is meant by the flexibility of the day-work plan?
9. Enumerate the different kinds of work on which the day-work system is best.
10. Is there danger of soldiering on tasks requiring extreme delicacy in perfection of workmanship? Why or why not?
11. Where several men work simultaneously on the same task what cautions should be observed in the inspection of the work?
12. Is there danger of very delicate and valuable machinery being injured by undue haste? Should the employer limit the output? Is there any other solution of this problem?
13. What caution should be observed with work that presents difficulties in measuring it?
14. Explain how repairing and clerical work may be measured and paid by the piece.
15. Explain the advantage of deciding definitely the amount and kind of work done.
16. Give five instances of work of such a nature that the workmen are kept involuntarily idle part of the time.
17. Explain the disadvantages of piece rates on new work.
18. Where payment by the day is necessary, what methods may be employed to stimulate a large output?
19. Give an example of the credit card system.
20. Outline a system by which the workmen are stimulated through definite hope of reward.

21. What is gained by a definite fixing of the responsibility for work performed on the individual workman?

22. With what classes of workers will the plan of letting the work-people go home after their tasks are done, prove most successful?

23. Describe the coöperative or profit-sharing plan.

24. What features about this plan hinder its efficacy in stimulating the workmen?

25. Under what conditions will the coöperative plan prove most successful?

CHAPTER XII.

Efficiency and Wages; Piece Work.

Pages 292-323.

1. Explain the employe's direct interest in large output under the piece-rate system.

2. What objections are most commonly offered against the piece-rate system?

3. In what sense is it true that "haste makes waste"?

4. What exceptions should be noted to this rule?

5. Under what conditions is piece work objectionable on the ground that the workmen will over-exert themselves?

6. Why should the workman wish to restrict his output when he is paid in proportion to the work done?

7. In what sense is the piece-rate plan a system of penalties for doing well?

8. What is generally understood as an extravagant rate of daily wages?

9. What is the attitude of the workman toward a cut in an "extravagant" piece rate?

10. What is meant by systematic soldiering?

11. Explain the danger of a fixed minimum of wages beyond which the workman cannot go.

12. What percentage above the average will induce the skilled mechanic to do his best?

13. What percentage above the average rate of wages is required in other kinds of work, and why?

14. What are the disadvantages of paying more than is necessary to secure the largest output of the workman?

15. Are cuts in piece rates necessary? If so, why should they not be made gradually and moderately to the desired point?

16. Do workmen object to cuts made in this way? If not, why not?

17. "The simple fact is that uncut piece rates lead to wages which under conditions of modern manufacture cannot be maintained." Explain.

18. If the foregoing is true, why have wages not declined in proportion to prices?

19. If the rates must be cut how can systematic soldiering be prevented?

20. Explain the advantages of the time guarantee plan.

21. What are the disadvantages of this plan?

22. What cautions should be observed in applying the proviso guarantee plan?

23. Under what conditions will it work best?

CHAPTER XIII.

Efficiency and Wages; Premium and Contract Plan.

Pages 325-354.

1. "Under the piece work system the employer has no direct interest in large output." Explain.

2. Why should the employer's indirect interest in large output under this system be so great?

3. Explain what is meant by an arrangement under which the direct gains from large output are divided between the employer and the employee.

4. Show by a concrete example the workings of the premium plan.

5. What is the connection between the premium plan and piece work?

6. Why is the premium plan not so directly effective as the time guarantee plan?

7. Why not do away with these objections by increasing the premium?
8. What rules should govern the amount of a premium?
9. What advantages has the time guarantee plan over the premium plan?
10. Is there any objection to starting with a low premium and raising it later?
11. "The premium plan imposes no penalty on the employe for not making good time." Is this a defect?
12. What is the most serious weakness in the premium plan?
13. State the disadvantages that arise from the practice of basing the premium on previous records.
14. In what cases should the time guarantee be combined with the premium plan, and why?
15. Describe the contract plan.
16. Under what conditions is this plan most successful?
17. What are its disadvantages from the employer's point of view?
18. How may these disadvantages be obviated?
19. What is the position of the workman under the contract plan?

CHAPTER XIV.

Efficiency and Wages; the Study of Unit Times.

Pages 355-378.

1. What is the fundamental requisite to a scientific system of wage pay?
2. State the disadvantages of not having an accurate scientific time for each job.
3. What is understood by a system that "induces the workman to work at maximum speed"?
4. What is meant by maximum speed?
5. Has the employer a right to expect this from his employes?
6. What is the relation of minimum standard time to systematic soldiering? To unconscious or natural soldiering?

7. Under what conditions would knowledge of minimum time cover all faults in the premium plan?

8. How does it prevent unfair and unjust premium rates?

9. Outline the study of unit time. Illustrate by a concrete example.

10. Should the standard time be that of the average or of a first-class workman? Discuss the considerations involved in determining this point.

11. Make out a form for a study of unit time on some simple operating with which you are familiar.

12. How minute should be the subdivision of the units be made?

13. Give an illustration of the methods of determining the best men for any kind of task.

14. What limitations are there to the study of unit times?

CHAPTER XV.

Efficiency and Wages; the Task Principle.

Pages 379-405.

1. State the advantages of a definitely assigned task.

2. Why will a man with a task do more than one who is merely under an incentive to go fast?

3. What is the simplest form of task system?

4. What is the practical difficulty in the way of this system?

5. Do you think that the task plan in its simplest form is just? Why or why not?

6. Why do workmen object to the task system?

7. What measures may be taken to secure their coöperation?

8. Are these measures always sure of success?

9. What difficulties does the task system present to workmen who are learning to attain standard time?

10. Explain the workings of the bonus plan. How is it related to the task system? To the premium plan?

11. How may the bonus plan be gradually shifted into the task plan?

12. Is it wise to do this?
13. Under what conditions is the bonus plan to be preferred to the simple task system?
14. Describe a series of partial bonuses.
15. Make up a series of full bonuses on graduated times.
16. Enumerate the instances in which the bonus plan is superior to any other in point of flexibility.
17. Describe the differential piece rate system. Illustrate by a concrete example.
18. For what kinds of work is the differential rate best?
19. In what kinds of work should the differential rate be avoided?
20. What in your mind constitutes the relation between efficiency and wages?

CHAPTER XVI.

Relation Between Employer and Employed.

Pages 407-436.

1. State some of the problems that might be included in a chapter under this title.
2. Do labor unions interfere with business?
3. Are labor combinations violations of the common law principle?
4. Should labor be considered in the same class with other salable commodities? Why or why not?
5. Under what disadvantage must the seller of labor dispose of his product?
6. How many of these disadvantages have been removed or made less onerous through labor unions?
7. What labor union theories or activities are open to objection?
8. Describe the "lump of labor" theory.
9. Is it to the interest of the working class as a whole to restrict output?
10. Prove that restricting output does not make more work for any class of laborers, but less.
11. What justification can be found for the rule "workmen should not be asked to do more than a fair day's work"?

12. What harm may the application of this rule do to capable and efficient men?
13. What has been the effect of trade unions in England?
14. Do you think the workingman whose union rules allow him to be idle half the day is happier on this account?
15. What is the position of the union man who is loyal to his employer and who wishes to advance to a higher position?
16. Are the interests of labor and capital necessarily opposed?
17. Do the workmen gain what the employers lose?
18. How could labor unions be managed so as to benefit both employers and men?
19. How may the employer introduce scientific management with unions as they are today?
20. "Proper treatment by the employers implies something more than strict honesty." Explain.
21. What are the objects of plans for social betterment?
22. Discuss plans aiming to better workmen's health and housing.
23. Compare, as to value, plans for intellectual improvement with plans for physical recreation of the employee.
24. Outline the methods of dealing with refractory and disobedient employees.

CHAPTER XVII.

Salesmanship and the Selling Department.

Pages 437-466.

1. Why is efficiency in his work of more importance to the salesman than to other kinds of workmen?
2. Why is efficiency more important to the selling department than any other?
3. What importance should be attached to the policy of securing big, impressive men as salesmen?
4. What is to be gained by careful training of the sales force?
5. In what ways may the manufacturer dispose of his products other than by selling them himself?

6. State the advantages and disadvantages of selling through a middleman.
7. For what kinds of products would you recommend a middleman system?
8. Outline the advantages of salesmen's meetings.
9. Draw up a programme for a salesmen's meeting in some business with which you are familiar.
10. State the best methods of handling the problem of exchanging the old products for new.
11. In what ways may the branch agencies coöperate with the central office?
12. What items should go into an instruction book for salesmen? Illustrate by reference to some well-known business.
13. Outline the work of training a new salesman both in the office and in the field.
14. To what use can salesmen's reports be put?
15. How may a sales manager make sure that the territory is being covered?

CHAPTER XVIII.

Advertising.

Pages 467-492.

1. From what points of view may the subject of advertising be studied?
2. What qualities are necessary in a successful advertising manager?
3. At what points do the work of the salesman and the advertiser touch?
4. How may the advertiser make effective use of the salesmen's demonstration meetings?
5. Outline a system of coöperation between the salesman and the advertising department in reaching prospective customers.
6. How may the sales force help the advertiser in making "copy"?
7. What is the place of an advertisement in the modern magazine or newspaper?

8. "The circular letter or folder is an intruder of the worst kind." Explain.

9. What is the exact value of "attract attention" copy?

10. Give several illustrations from your own experience of advertising copy that attracts attention only.

11. What kinds of products would you consider adaptable to "reason why" advertising.

12. What is the value of a trade-mark?

13. With what kinds of products should the trade-mark be emphasized? When should it be kept in the background?

14. Give illustrations of "reason why" copy on soap, sugar, and coffee.

15. What tests should be applied to the products to be advertised and considered in making out copy?

16. Draw up advertising copy, which will illustrate the principles brought out in this chapter, for three products with which you are familiar.

INDEX

A.

Advertising	467
Advertising Copy.....	476
Advisory Board.....	147
Authority	94

B.

Bonus Plan, The.....	389
Buying Department.....	123

C.

Contract Plan	349
Corporations	37
Coöperative Plan.....	388

D.

Differential Piece-rate System.....	401
Discipline	434
Division of Labor.....	45
Domestic System, The.....	25

E.

Economies of Production.....	148
Efficiency in Wages—Day Work.....	263
Employment Bureau	202

F.

Factory System, The.....	29
Foremen's Reports.....	149
Functional Organization	161
Functional Foremen.....	174

G.

Guilds, The.....	18
------------------	----

H.

Handicraft System, The.....	14
Household System, The.....	11
High Speed Steel.....	216

I.

Industrial Betterment.....	428
Internal Organization	87
Instruction Cards.....	221
Inspection	280

L.

Labor Unions.....	407
-------------------	-----

M.

Machine Work	209
Military Organization.....	133
Mnemonic Symbols.....	198

N.

"Name" Copy.....	483
------------------	-----

O.

Office, The.....	185
Overhead Cost.....	267

P.

Partnerships	36
Piece-work	293
Planning Department	121
Premium Plan, The.....	325
Profit-sharing Plan, The.....	288
Proviso Guarantee	321

R.

"Reason Why" Copy.....	487
Responsibility	95
Roundabout Processes.....	136

INDEX

515

S.

Salesmanship	437
Salesmen's Meetings.....	449
Salesmen's Training Department.....	461
Sales Estimate Reports.....	190
Special Departments.....	74
Standardization of Industry.....	76
Sub-Council Boards	155

T.

Task Principle, The.....	371
Territorial Division of Labor.....	57
Time Guarantee.....	317

U.

Unit Times.....	355
-----------------	-----

W.

Walking Delegates.....	416
Wasted Time.....	237

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